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THE

VOYAGE OF H.M.S. CHALLENGER.

A SUMMARY OF THE SCIENTIFIC RESULTS.

SECOND PART.

REPORT

ON THE

SCIENTIFIC RESULTS

OF THE

VOYAGE OF H.M.S. CHALLENGER

DURING THE YEARS 1872-76

UNDER THE COMMAND OF

CAPTAIN SIR GEORGE S. NARES, R.N., F.R.S.,

AND THE LATE

CAPTAIN FRANK TOURLE THOMSON, R.N.

PREPARED UNDER THE SUPERINTENDENCE OF

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DIRECTOR OF THE CIVILIAN SCIENTIFIC STAFF ON BOARD

AND NOW OF

JOHN MURRAY

ONE OF THE NATURALISTS OF THE EXPEDITION

A SUMMARY OF THE SCIENTIFIC RESULTS

SECOND PART

(WITH APPENDICES)

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A SUMMARY

OF THE

SCIENTIFIC RESULTS

OBTAINED AT THE

SOUNDING, DREDGING, AND TRAWLING STATIONS OF H.M.S. CHALLENGER

SECOND PART.

BY

JOHN MURRAY,

ONE OF THE NATURALISTS OF THE EXPEDITION, DIRECTOR OF THE WORK CONNECTED WITH THE PUBLICATION OF THE SCIENTIFIC RESULTS OF THE EXPEDITION, AND EDITOR OF THE CHALLENGER REPORT.

(SUMMARY OF RESULTS CHALL. EXP.—1895.)

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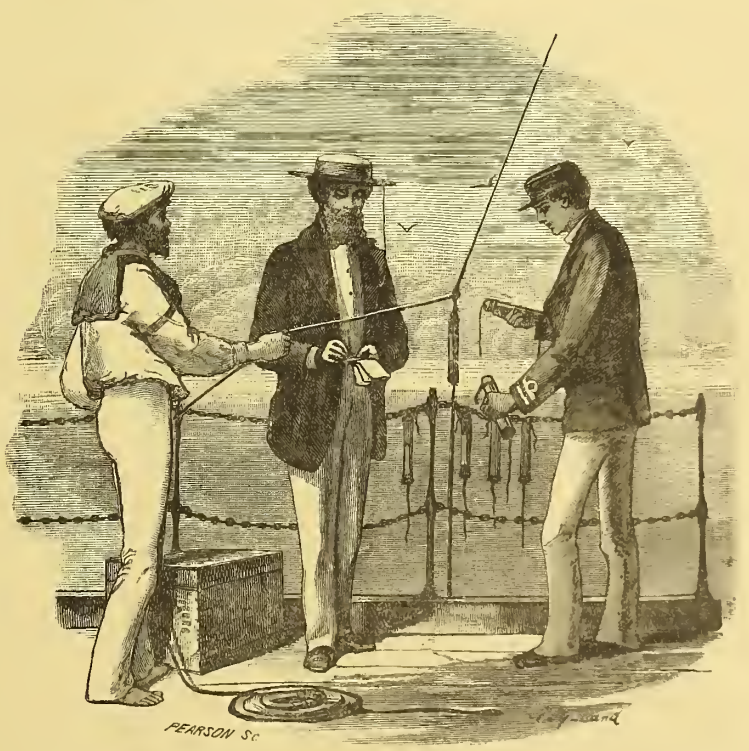

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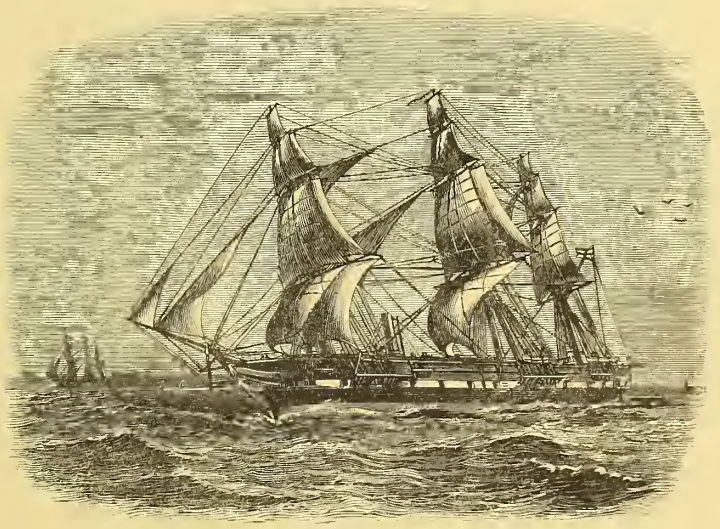

H.M.S. Challenger under Sail, 1874.

"*And so he plays his part.*"
—As You Like It.

condition, and very frequently with Diatoms and other minute organisms in the interior. Not more than one or two specimens of *Pyrocystis* were observed in the tow-nets during this time. *Ceratium* (*Peridinium*) *tripos* was also abundant, but never observed *in catena*. Spherical jelly-masses, in which were minute Diatoms (*Coscinodiscus* and *Navicula*), were very abundant, as well as Oscillatoriaceæ, Medusæ, *Diphyes*, *Sagitta*, Aphroditacean larvæ, *Evadne*, numerous Copepods, Cirriped larvæ, and *Appendicularia*. HONG KONG.

Shortly after leaving Hong Kong the screw was taken up, and was found to be covered with *Tubularia*, *Caprella*, small Copepods, and *Balanus*, very much like what was observed after leaving the Cape (December 20, 1873).

Station 206 (Sounding 342), Hong Kong to Manila (see Chart 31 and Diagram 14). STATION 206.

January 8, 1875 ; lat. 17° 54′ N., long. 117° 14′ E.
Temperature of air at noon, 76°·0 ; mean for the day, 74°·3.
Temperature of water :—

	°		°
Surface, ...	75·2	200 fathoms, . . .	48·5
10 fathoms, . . .	75·1	250 „ . . .	46·5
20 „ . . .	75·0	300 „ . . .	45·0
30 „ . . .	74·2	350 „ . . .	43·6
40 „ . . .	72·3	400 „ . . .	42·4
50 „ . . .	68·5	500 „ . . .	40·2
60 „ . . .	66·0	600 „ . . .	38·7
70 „ . . .	64·2	700 „ . . .	37·5
80 „ . . .	62·2	800 „ . . .	36·7
90 „ . . .	60·6	900 „ . . .	36·5
100 „ . . .	59·2	1000 „ . . .	36·5
150 „ . . .	51·6	Bottom, . . .	36·5

Density at 60° F. at surface, 1·02538 ; bottom, 1·02568.
Depth, 2100 fathoms ; deposit, Blue Mud, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 6 A.M. got up steam. At 9.15 A.M. shortened and furled sails. At 9.30 A.M. proceeded under steam and sounded in 2100 fathoms about half-way between Cape Bojeador, N.W. extremity of Luzon Island, and Macclesfield Bank, and about the middle of the China Sea. At 11 A.M. put trawl over. At 1 P.M. obtained serial temperatures down to 1000 fathoms. At 3.15 P.M. commenced heaving in trawl, which came up at 5 P.M. with only one Caridid shrimp and a small fish. It is probable that the trawl never reached the bottom. Made sail.

Station 206. Distance at noon from Corregidor Island Lighthouse, Manila Harbour, 289 miles; from north point of Scarborough Shoal, 165 miles. Made good 168 miles. Amount of current 26 miles, direction S. 36° W.

Animals from Trawl. The following species is recorded from the trawl at this Station :—

Macrura (Spence Bate, Zool. pt. 52).

Gennadas parvus, n.g., n.sp. One specimen; for distribution see Station 45.

A small Scopelid fish was also in the trawl.

Organisms from the Deposit. The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :—

Foraminifera (Brady, Zool. pt. 22).—Pelagic species marked thus ×.

Miliolina labiosa (d'Orbigny).
Hyperammina ramosa, Brady.
Reophax scorpiurus, Montfort.
Haplophragmium globigeriniforme (Parker and Jones).
„ *latidorsatum* (Bornemann).
Hormosina ovicula, Brady.
Ammodiscus gordialis (Jones and Parker).
Trochammina trullissata, Brady.
Gaudryina baccata, Schwager.
„ *siphonella*, Reuss.
Chilostomella ovoidea, Reuss.
Lagena gracillima (Seguenza).
„ *lævigata* (Reuss).
× *Globigerina bulloides*, d'Orbigny.
× „ *dubia*, Egger.
× „ *æquilateralis*, Brady.
× *Pullenia obliquiloculata*, Parker and Jones.
× *Sphæroidina dehiscens*, Parker and Jones.
Truncatulina lobatula (Walker and Jacob).
× *Pulvinulina menardii* (d'Orbigny).
× „ *tumida*, Brady.

Radiolaria (Haeckel, Zool. pt. 40).

Acrosphæra setosa, Haeckel.
Actinosphæra lævis, Ehrenberg.
Stylosphæra setosa, Ehrenberg.
Spongodiscus elliptica, Haeckel.
Cyphinus penicillatus, Haeckel.
Dictyastrum triactis, Ehrenberg.
Brachiospyris diacantha, Haeckel.
Ceratospyris krausei, Haeckel.
Lophospyris comosa, Haeckel.
Tricolospyris newtoniana, Haeckel.
Tripocalpis plectaniscus, Haeckel.
Peridium curvipes, Haeckel.
Dictyocephalus capito, Ehrenberg.
Tricolocampe pupa, Haeckel.
Eucyrtidium profundissimum, Ehrenberg.
Lithocampe multiseriata, Haeckel.
Cyrtocapsa compacta, Haeckel.

Organisms from Surface Nets. **Surface Organisms.**—The following species are recorded from the surface of the China Sea in the vicinity of Station 206 :—

Radiolaria (Haeckel, Zool. pt. 40).

Lychnaspis longissima, Haeckel.
Phalomelissa galeata, Haeckel.
Lamprodiscus cosmoidiscus, Ehrenberg.
Sethoconus trochus, Haeckel.
Theocorys turgidula, Haeckel.
Theocampe cassis, Haeckel.
Dictyomitra macilenta, Haeckel.

COPEPODA (Brady, Zool. pt. 23).

Calanus gracilis, Dana.
Eucalanus attenuatus (Dana).
,, *setiger*, n.sp.
Rhincalanus cornutus, Dana.
,, *gigas*, n.sp.
Undina darwinii, Lubbock.
Scolecithrix danæ (Lubbock).
Euchæta prestandreæ, Philippi.
,, *hessei*, n.sp.
Candace pectinata, Brady.
,, *truncata*, Dana.
Ætidius armatus, n.g., n.sp.
Temora dubia (Lubbock).
Centropages violaceus (Claus).
Oithona challengerii, n.sp.
Corycæus varius, Dana.
,, *venustus*, Dana.
Copilia mirabilis, Dana.
Oncæa obtusa (Dana).
Saphirina metallina, Dana. STATION 206.
,, *opalina*, Dana.

AMPHIPODA (Stebbing, Zool. pt. 67).

Phronimella elongata, Claus.
Hyperia luzoni, n.sp.
Sympronoë parva (Claus).

SCHIZOPODA (Sars, Zool. pt. 37).

Stylocheiron suhmii, n.g., n.sp.

MACRURA (Spence Bate, Zool. pt. 52).

Sergestes intermedius, n.sp.
Lucifer reynaudii, M.-Edwards.
Caricyphus turgidus, n.g., n.sp.
Anebocaris quadroculus, n.g., n.sp.

LARVAL GASTEROPODA (see Pelseneer, Zool. pt. 65).

Agadina stimpsoni, Adams.

In addition, the following are recorded in the note-books (January 8 and 9):—Oscillatoriaceæ, *Pyrocystis*, Diatoms, *Peridinium tripos* and another species (twenty-seven counted in one chain), *Globigerina*, *Orbulina*, *Sphæroidina*, *Pullenia*, *Pulvinulina*, Acanthometræ and other Radiolaria, Medusæ and larvæ, *Diphyes*, *Velella*, *Chirodota* and other Echinoderm larvæ, *Sagitta*, *Alciopa*, tubicolous and Aphroditacean Annelid larvæ, *Cypridina*, *Caprella*, *Anchylomera thyropus*, *Euphausia*, many small Crustacea, *Atlanta*, *Cymbulia* larvæ, Pteropods, *Cranchia*, *Appendicularia*, *Salpa* (two species). In the stomachs of the *Salpæ* were Diatoms, Coccospheres, Rhabdospheres (two varieties), and Rhabdoliths. Porpoises, flying-fish, a shark, and a white and blue snake were seen.

The Challenger remained at Manila, on the second visit, from 4 P.M. on January 11 till 11 P.M. on January 14, 1875. AT MANILA.

Surface Organisms.—A short haul of the tow-net was taken just outside Manila Harbour and yielded the usual oceanic things, including *Pilidium* and a number of fish eggs. Inside the harbour the material from the tow-net was of the same character as ORGANISMS FROM SURFACE-NETS.

STATION 206 obtained on the first visit two months previously, including many varieties of Diatoms, *Noctiluca* (much smaller than at Hong Kong, and of a delicate rose tint), *Ceratium* (*Peridinium*) *tripos* (very seldom *in catena*) and another species, and a number of Infusoria, &c.

STATION 207 **Station 207** (Sounding 343), Manila to Samboangan (see Chart 31 and Diagram 14).

January 16, 1875 ; lat. 12° 21′ N., long. 122° 15′ E.
Temperature of air at noon, 80°·8 ; mean for the day, 79°·5.
Temperature of water :—

Surface,	80°·0	225 fathoms,	51°·9
25 fathoms,	77·2	250 „	51·7
50 „	72·5	275 „	51·6
75 „	62·0	375 „	51·6
100 „	58·5	475 „	51·6
125 „	56·0	575 „	51·6
150 „	54·1	675 „	51·6
175 „	53·1	Bottom,	51·6
200 „	52·4		

Density at 60° F. :—

Surface,	1·02515	200 fathoms,	1·02549
50 fathoms,	1·02536	Bottom,	1·02557
100 „	1·02546		

Depth, 700 fathoms ; deposit, Blue Mud, containing 3·22 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 6 A.M. passed between Maestro de Campo and Banton Islands, steamed south of Simara Island, and about 10 A.M. entered the strait between Tablas and Romblon Islands. At 1.50 P.M. stopped and sounded in 700 fathoms. At 2 P.M. sent down trawl. Obtained serial temperatures down to the bottom. The carbonic acid was determined in surface water, and amounted to 37·2 milligrammes per litre. At 5.45 P.M. trawl came up with several specimens. Position of sounding and trawling about four miles south of the sounding of 705 fathoms (Station 204) obtained on November 2, 1874, on the way north. At 6 P.M. made all plain sail.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Station 207. Animals from Trawl.

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Suberites ramulosus, n.sp. Five specimens; obtained also at Station 209, 95 fathoms (var. *cylindrifera*).

Hexactinellida (Schulze, Zool. pt. 53).

Farrea occa (Bowerbank), Carter. Numerous specimens; obtained also at Stations 24 and 170.

Alcyonaria (Wright and Studer, Zool. pt. 64).

Acanthogorgia longiflora, n.sp. One specimen; obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophiacantha abnormis, n.sp. Obtained also at Station 210, 375 fathoms.

Echinoidea (Agassiz, Zool. pt. 9).

Prionechinus sagittiger, n.g., n.sp. Obtained also at Stations 164 and 218. Only species of the genus.

Holothurioidea (Théel, Zool. pt. 39).

Pælopatides aspera, n.g., n.sp. One specimen; obtained at no other locality.

Macrura (Spence Bate, Zool. pt. 52).

Hemipenæus gracilis, n.g., n.sp. Six specimens; obtained at no other locality.

Sergestes japonicus, n.sp. Two specimens; obtained also at Station 232, 345 fathoms.

Heterocarpus gibbossus, n.sp. One specimen; obtained at no other locality. Recorded subsequently from Indian Ocean ("Investigator").

Acanthephyra media, n.sp. Two specimens; obtained at no other locality.

Oplophorus brevirostris, n.sp. One specimen; obtained at no other locality.

Anomura (Henderson, Zool. pt. 69).

Munidopsis milleri, n.sp. Three specimens; obtained at no other locality.

Brachyura (Miers, Zool. pt. 49).

Ethusa (*Ethusina*) *gracilipes*, n.sp. Four specimens; obtained also at Stations 191 and 195 (var.).

Lamellibranchiata (Smith, Zool. pt. 35).

Modiola watsoni, n.sp. One specimen; obtained also at Station 191.

Pecten vitreus (Chemnitz). For distribution see Station 204.

Amussium caducum, n.sp. Obtained at no other locality.

Station 207. Cephalopoda (Hoyle, Zool. pt. 44).

Sepia recurvirostra, Steenstrup (?). Broken shell; obtained at no other locality by the Challenger. Recorded from Eastern Archipelago.

Fishes (Günther, Zool. pt. 57).

Trachypterus repandus, Costa (?). One specimen; obtained at no other locality by the Challenger.

Halosaurus mediorostris, n.sp. One specimen; obtained at no other locality.

In addition to the foregoing, the Station-book records a third Sponge and Ascidian.

Excluding Protozoa, over 50 specimens of invertebrates and fishes were obtained at this Station, belonging to about 22 species, of which 15 are new to science, including representatives of 3 new genera; 9 of the new species were not obtained elsewhere.

Willemoes-Suhm writes: "The borders of the bivalves, the stems of some of the Sponges, and the crabs were covered with a black substance, probably peroxide of manganese. The crab obtained was a true *Dorippe*, distinguished by the large opening into the branchiæ with its prominent borders, and the dorsal position of the last pereiopods; a small Peneid was distinguished by the size of the anterior appendages of the pereiopods."

Organisms from Surface Nets.

Surface Organisms.—The following are recorded in the note-books from the surface at this Station:—Diatoms, Oscillatoriaceæ, *Globigerina*, *Orbulina*, Acanthometræ and other Radiolaria, Medusæ (*Æginetа*) very common, small Physalids, Echinoderm larvæ, *Sagitta* with eggs and sperma, *Alciopa*, larvæ of several Annelids, asexual Nematodes, *Calanus*, *Copilia*, *Saphirina*, and other Copepods, *Hyperia*, *Sergestes*, *Lucifer*, larvæ of prawns, *Zoeæ*, small Brachyurous crabs, small shells with velum, *Atlanta*, *Hyalæa* [= *Carolinia*], *Styliola*, *Thecosomata* [= *Halopsyche*] *gaudichaudi*, Pteropod larvæ, Cephalopod larvæ.

Willemoes-Suhm writes: "Most of the *Sagittæ* were to-day filled with eggs and sperma. In one of them was a Cestode larva, with unarmed rostellum, 3 mm. in length."

Station 208.

Station 208 (Sounding 344), Manila to Samboangan (see Chart 31).

January 17, 1875; lat. 11° 37′ N., long. 123° 31′ E.

Temperature of air at noon, 79°·8; mean for the day, 79°·7.

Temperature of water at surface, 81°·0. Station 208.
Density at 60° F. at surface, 1·02517.
Depth, 18 fathoms ; deposit, Blue Mud.

In the course of the forenoon passed between Zupata Mayor and Tintololo Islands, and near the track of November 1, 1874. At 3 P.M. stopped about 10 miles E. of Gigantes Island and obtained three hauls with the trawl in 18 fathoms, many specimens being brought up. At 4.50 P.M. proceeded S.S.E., Pan de Azucan Island and the E. coast of Panay Island in sight to the westward. Later in evening passed Tanguingi Island, a small patch barely showing above the sea-surface. At 10 P.M. sighted Gato Island, a pyramidal rock rising abruptly out of the water, and the N. extremity of Zebu Island. About midnight passed through channel between Chocolate Island and Pulo Luzon. When near Gato Island there was a slight squall from the N.E. accompanied by vivid flashes of lightning.

The following species are recorded in the Zoological Reports from the trawl at this Station :— Animals from Trawl.

Keratosa (Poléjaeff, Zool. pt. 31).

Cacospongia dendroides, n.sp. Three specimens ; obtained at no other locality.
,, *oligoceras*, n.sp. One specimen ; obtained at no other locality.

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Petrosia similis, n.sp., var. *compacta*, nov. One specimen ; obtained at no other locality.
,, *truncata*, n.sp. One specimen ; obtained at no other locality.
,, *variabilis* (Ridley), var. One specimen ; obtained at no other locality by the Challenger. Recorded from Australia.
Pachychalina fragilis, n.sp. Several specimens ; obtained at no other locality.
,, *melior*, n.sp. Two specimens ; obtained at no other locality.
,, *fibrosa*, n.sp. One specimen ; obtained also at Bermuda (?) and Bahia.
Chalina rectangularis, n.sp. One specimen ; obtained at no other locality.
Gellius varius (Bowerbank). Several specimens ; obtained at no other locality by the Challenger. Recorded from Malacca Strait and Australia.
Esperella parishii (Bowerbank). One specimen (encrusting *Pecten* shell) ; obtained at no other locality by the Challenger. Recorded from Malacca Strait and Australia.
Rhaphidophlus filifer, n.sp. One specimen ; obtained at no other locality.
Hymeniacidon (?) *subacerata*, n.sp. Three specimens ; obtained at no other locality.

STATION 208

Thrinacophora cervicornis, n.g., n.sp. Two specimens; obtained at no other locality.
Spirastrella decumbens, Ridley, var. One specimen; obtained at no other locality by the Challenger. Recorded from Torres Strait.
" *solida*, n.sp. Three specimens; obtained at no other locality.

TETRACTINELLIDA (Sollas, Zool. pt. 63).

Chrotella macellata, n.g., n.sp. Four specimens; obtained at no other locality. The only other species of the genus (*Chrotella simplex*) was taken at Station 163A.
Myriastra clarosa (Ridley). One specimen; obtained also at Station 186.
Theonella swinhoei, Gray. One specimen and fragments; obtained at no other locality by the Challenger. Recorded from Formosa.
Tethya japonica, n.sp. Two specimens; obtained at no other locality.

ALCYONARIA (Wright and Studer, Zool. pt. 64).

Plexaurella philippinensis, n.sp. One specimen; obtained at no other locality.
Scleronephthya pustulosa, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.
Sarcophytum philippinensis, n.sp. One specimen; obtained at no other locality.

ACTINIARIA (Hertwig, Zool. pts. 15 and 73).

Calliactis polypus (Forskål). Three specimens (on *Murex* shell); obtained also at Cape Verdes.
Sphenopus marsupialis, Steenstrup. One specimen; obtained also at Station 188.

CORALS (Moseley, Zool. pt. 7).

Balanophyllia sp. (?). One broken specimen.

CRINOIDEA (Carpenter, Zool. pt. 60).

Antedon parvicirra, n.sp. One specimen; obtained at no other locality.
" *informis*, n.sp. One specimen; obtained at no other locality.
" *marginata*, n.sp. One specimen; obtained at no other locality.
Actinometra fimbriata (Lamarck). One specimen; obtained also at Banda.
" *nobilis*, n.sp. One specimen; obtained also at Samboangan, 10 fathoms.

ASTEROIDEA (Sladen, Zool. pt. 51).

Stellaster incei, Gray. Obtained also at Stations 186, 187, and 188.

OPHIUROIDEA (Lyman, Zool. pt. 14). STATION 208.

Pectinura stellata (Ljungman). Obtained at no other locality by the Challenger.
Ophiactis savignyi (Müller and Troschel). Obtained also at Samboangan, 10 fathoms.
Ophiothrix pusilla, Lyman. Obtained at no other locality by the Challenger.
,, *exigua*, Lyman. Obtained also at Station 188 (var. ?).
,, *striolata*, Grube. Obtained also at Samboangan, 10 fathoms.
,, *virgata*, Lyman, (young ?). Obtained at no other locality by the Challenger. Recorded from Kingsmill Islands.

ECHINOIDEA (Agassiz, Zool. pt. 9).

Peronella decagonalis (Lesson). For distribution see Station 172.

HOLOTHURIOIDEA (Théel, Zool. pt. 39).

Holothuria spinifera, n.sp. Two specimens; obtained at no other locality.

GEPHYREA (Selenka, Zool. pt. 36).

Phymosoma scolops, Selenka and De Man. One specimen; obtained at no other locality by the Challenger. Recorded from Singapore, Red Sea, and Mozambique.

MYZOSTOMIDA (Graff, Zool. pt. 61).

Myzostoma membranaceum, n.sp. Two specimens (on *Antedon marginata*).

CIRRIPEDIA (Hoek, Zool. pt. 25).

Acasta fenestrata, Darwin. One specimen; obtained at no other locality by the Challenger.

MACRURA (Spence Bate, Zool. pt. 52).

Alpheus crinitus, Dana. One specimen; obtained also at Samboangan reefs.
,, *spiniger*, Stimpson. One specimen; obtained at no other locality by the Challenger. Recorded from Loo Choo.
,, *biunguiculatus*, Stimpson. Two specimens; obtained at no other locality by the Challenger. Recorded from Nicobars.

ANOMURA (Henderson, Zool. pt. 69).

Spiropagurus spiriger (De Haan). Two specimens; for distribution see Station 188.
Paguristes hians, n.sp. One specimen; obtained at no other locality.
,, sp. (?). One imperfect specimen.
Galathea aculeata, Haswell. Several specimens; obtained also at Station 172.

Station 208. Brachyura (Miers, Zool. pt. 49).

Hyastenus diacanthus (De Haan). One specimen; obtained also at Station 190.

,, *oryx*, M.-Edwards. Two specimens; obtained at no other locality by the Challenger. Recorded from Oriental region.

Pilumnus dehaani, Miers. One specimen; obtained at no other locality by the Challenger. Recorded from Japan.

Neptunus (*Amphitrite*) *rugosus*, M.-Edwards. One specimen; obtained also at Station 212 and Torres Strait.

,, (,,) *spinipes*, n.sp. Three specimens; obtained at no other locality.

Lamellibranchiata (Smith, Zool. pt. 35).

Anatina siphonata, Reeve. One specimen; obtained at no other locality by the Challenger.

Cardium (*Bucardium*) *tenuicostatum*, Lamarck. Obtained also at Port Jackson.

,, (,,) *australe*, Sowerby. One specimen; obtained also at Fiji.

Chama carditæformis, Reeve (?). One specimen; obtained at no other locality by the Challenger.

Diplodonta subgranulosa, n.sp. Obtained at no other locality.

Arca (*Barbatia*) *lima*, Reeve. Obtained also at Station 186.

Pecten leopardus, Reeve, var. *solaris*, Sowerby. Obtained at no other locality by the Challenger. Recorded from Australia, New Caledonia, Amboina, Macassar, and China.

,, *senatorius* (Gmelin), var. Obtained also at Station 203.

Gasteropoda (Watson, Zool. pt. 42).

Trochus (*Euchelus*) *atratus* (Gmelin). Obtained also at Cape York.

Murex (*Tribulus*) *nigrospinosus*, Reeve. Obtained at no other locality by the Challenger. Recorded from Andamans and Red Sea.

,, (*Phyllonotus*) *endivia*, Lamarck. Obtained also at Zebu. Recorded from Philippines.

Rapana bulbosa, Solander. Obtained at no other locality by the Challenger. Recorded from China, Japan, and Philippines.

Nassa (*Zeuxis*) *algida*, Reeve. Obtained also at Cape York (?).

Phos roseatus, Hinds. Obtained also at Station 212 and Arrou Islands.

Fasciolaria trapezium (Linné). Obtained at no other locality by the Challenger. Recorded from Indian Ocean and Malay Archipelago.

Latirus n.sp. (?).

Pleurotoma marmorata, Lamarck. Obtained also at Station 187 and Fiji.

Ranella margaritula, Deshayes. Obtained also at Arrou Islands.

Nassaria suturalis, Adams, var. *bitubercularis*, Adams. Obtained at no other locality by the Challenger. Recorded from Australia, New Guinea, and Malacca. Station 208.

Strombus (*Gallinula*) *columba*, Lamarck. Obtained also at Station 212, 10 to 20 fathoms. Recorded from Indian and Pacific Oceans.

Terebellum punctatum, Chemnitz. Obtained also at Station 172.

Separatista chemnitzii, Adams. Obtained at no other locality by the Challenger. Recorded from Philippines.

Natica (*Mamma*) *draparnaudi*, Recluz. Obtained at no other locality by the Challenger. Recorded from Philippines.

Xenophora solarioïdes (Reeve). Obtained also at Station 212 and Torres Strait.

Polyzoa (Busk, Zool. pt. 30).

Nellia oculata, Busk. Obtained also at Stations 148, 151, 188, 190, and Bahia.

Amphiblestrum papillatum, n.g., n.sp. Obtained at no other locality.

Retepora mucronata, n.sp. Two or three fragments; obtained at no other locality.

Microporella personata (Busk). Obtained at no other locality by the Challenger. Recorded from Falklands.

Lepralia feegeensis, n.sp. Obtained at no other locality by the Challenger. Recorded from Hong Kong.

Tunicata (Herdman, Zool. pts. 17 and 38).

Polycarpa irregularis, n.sp. One specimen; obtained at no other locality.

Botrylloides tyreum, n.sp. One specimen; obtained at no other locality.

In addition to the foregoing, the following are recorded in the Station-book:—Renillid, two Sertularians, small urchin, several Annelids, *Balanus*, *Squilla*, *Cymothoa*, *Solea*, *Diodon*, *Platycephalus*, and *Hippocampus*.

Excluding Protozoa, over 150 specimens of invertebrates and fishes were obtained at this Station, belonging to about 95 species, of which 31 are new to science, including representatives of 3 new genera; 28 of the new species and 1 new genus were not obtained elsewhere.

Willemoes-Suhm writes: "The fauna was not very interesting; except a large Comatula and a spotted Holothurian; the things obtained were not extraordinary in look or size, being chiefly Sponges and fleshy polyps, containing a lot of Annelids, which came out as the Sponges died off in water, and also the Balanid *Acasta*, of which four species were known to Darwin from the Philippines, all living in *Isis* and Sponges. *Eschara*,

Station 208. *Retepora*, and another Polyzoon spreading over *Pinna* and other shells, were present, along with compound Ascidians. Crabs, *Alpheus* (mostly in Sponges), and small *Galatheæ* were common. There were also many shells, especially *Murex* and *Pecten*, the latter very large and fine."

The stomachs of the Holothurians contained a greenish mass composed of pieces of broken shells, Echini spines, and many varieties of shallow-water Foraminifera.

At Zebu. The Challenger remained at Zebu from 1.30 P.M. on January 18 till 4 P.M. on January 24, 1875. During this time dredgings were taken from the steam pinnace and from the ship on the *Euplectella*-ground in 85 and 95 fathoms (see Station 209).

Organisms from Surface-Nets. Surface Organisms.—While at anchor at Zebu the tow-net procured:—Diatoms, two shore forms of Foraminifera, small Acanthometræ, Medusæ, *Diphyes*, Ctenophoræ, *Tomopteris*, Copepods, Amphipods, larval Lamellibranchs and Gasteropods, and *Appendicularia*.

Station 209. ## Station 209 (Sounding 345), Manila to Samboangan (see Chart 31).

January 22, 1875; lat. 10° 14′ N., long. 123° 54′ E.
Temperature of air at noon, 81°·3; mean for the day, 79°·3.
Temperature of water at surface, 81°·0; bottom, 71°·0.
Depth, 95 fathoms; deposit, Blue Mud, containing 35·82 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 7 A.M. got up steam. At 9 A.M. weighed anchor and proceeded out of Zebu Harbour through the south channel with a party of visitors on board, and the steam pinnace in company. At 10 A.M. stopped and put dredge over in 95 fathoms, off the S. entrance of channel between Zebu and Mactan Islands, on the *Euplectella*-ground. In the course of the day the big dredge was lowered five or six times in depths varying from 95 to 100 fathoms, many specimens being obtained. At 3 P.M. completed dredging, and at 4.15 P.M. returned to the anchorage in Zebu Harbour.

Animals from Dredge. The following species are recorded in the Zoological reports from the dredge at this Station:—

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Reniera cinerea (Grant). One specimen; obtained at no other locality by the Challenger. Recorded from British seas.

Suberites ramulosus, n.sp., var. *cylindrifera*, nov. Many specimens ; the species was obtained at Station 207. Station 209.

Tetractinellida (Sollas, Zool. pt. 63).

Thenea wyvillii, n.sp. Several specimens ; obtained at no other locality.

Hexactinellida (Schulze, Zool. pt. 53).

Euplectella aspergillum, Owen. Many specimens ; obtained at no other locality by the Challenger. Recorded from Philippines.

Polylophus philippinensis (Gray). Numerous specimens; obtained also at Station 192.

Crateromorpha meyeri, Gray. Several specimens ; obtained at no other locality by the Challenger. Recorded from Philippines and Japan.

Semperella schultzei (Semper). One specimen ; obtained also at Station 192.

Calcarea (Poléjaeff, Zool. pt. 24).

Sycon raphanus, Schmidt. One specimen ; obtained also at Station 135.

„ *arcticum* (Haeckel). One specimen ; obtained also at Station 36.

Leucilla connexiva, n.sp. Several fragments ; obtained at no other locality.

„ *uter*, n.sp. Two specimens ; obtained also at Station 36.

Leuconia multiformis, n.sp. Obtained also at Station 36.

Pennatulida (Kölliker, Zool. pt. 2).

Kophobelemnon burgeri, Herklots. Two specimens ; obtained at no other locality by the Challenger.

Actiniaria (Hertwig, Zool. pt. 73).

Halcampella maxima, n.sp. Six specimens ; obtained at no other locality.

Stephanidium schulzii, n.g., n.sp. Five specimens ; obtained at no other locality. Only species of the genus.

Actinians, two species undetermined.

Corals (Moseley, Zool. pt. 7).

Stephanophyllia formosissima, n.sp. Several specimens ; obtained also at Station 192.

Crinoidea (Carpenter, Zool. pt. 32).

Metacrinus interruptus, n.g., n.sp. One specimen ; obtained at no other locality.

Station 209. Asteroidea (Sladen, Zool. pt. 51).

Asterias (*Stolasterias*) *volsellata*, n.sp. Obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophiacantha longidens, n.sp. Obtained at no other locality.
Ophiocamax vitrea, n.g., n.sp. Obtained also at Stations 192, 201, 204, and 219.
Ophiothrix ciliaris (Lamarck). Obtained at no other locality by the Challenger.
,, *berberis*, n.sp. Obtained also at Station 192.
,, *capillaris*, n.sp. Obtained also at Station 204.

Echinoidea (Agassiz, Zool. pt. 9).

Salenia hastigera, n.sp. For distribution see Station 106.
Aspidodiadema tonsum, n.g., n.sp. Obtained also at Stations 124, 170, and 171.
Micropyga tuberculata, n.g., n.sp. Obtained also at Stations 174, 204, and 219. Only species of the genus.
Asthenosoma pellucidum, n.sp. Obtained also at Station 192.

Holothurioidea (Théel, Zool. pts. 13 and 39).

Ilyodæmon maculatus, n.g., n.sp. Three specimens; obtained also at Stations 192 and 219. Only species of the genus.
Cucumaria mirabilis, n.sp. One specimen; obtained also at Port Jackson.

Nemertea (Hubrecht, Zool. pt. 54).

Cerebratulus sp. (?). Fragments.

Annelida (M'Intosh, Zool. pt. 34).

Lagisca (?) *hexactinellidæ*, n.sp. Two specimens (in *Euplectella*); obtained at no other locality.
Polynoë (*Langerhansia*) *euplectellæ*, n.sp. Several specimens (in *Euplectella*); obtained at no other locality.
Syllis ramosa, n.sp. Several specimens (in *Euplectella*); obtained also at Station 192.
Cirratulus zebuensis, n.sp. One specimen; obtained at no other locality.
Artacama zebuensis, n.sp. One specimen; obtained at no other locality.
Sabella zebuensis, n.sp. Two specimens; obtained at no other locality.

Macrura (Spence Bate, Zool. pt. 52).

Arctus orientalis, n.sp. Two specimens; obtained at no other locality.

Spongicola venusta, De Haan. Many specimens (in *Euplectella*); obtained at no other locality by the Challenger. Recorded from Japan.

Penæus fissurus, n.sp. Ten specimens; obtained also at Stations 190 and 204

„ *rectacutus*, n.sp. One specimen; obtained also at Station 173.

Anomura (Henderson, Zool. pt. 69).

Homola orientalis, n.sp. One specimen; obtained also at Station 192.

Latreillopsis bispinosa, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Latreillia valida, De Haan. One specimen; obtained at no other locality by the Challenger. Recorded from Japan.

Galathea grandirostris, Stimpson. One specimen; obtained at no other locality by the Challenger.

Lamellibranchiata (Smith, Zool. pt. 35).

Pecten vitreus (Chemnitz). For distribution see Station 204.

Tunicata (Herdman, Zool. pt. 38).

Leptoclinum albidum, Verrill, var. *grande*, nov. Several specimens; the species obtained also at Cape Verdes and Simon's Bay.

In addition to the foregoing, the following are recorded in the Station-book:— Lepadid, *Ægа spongiphila* parasitic in *Euplectella*, two specimens of *Cymopolia* (?), Stenorhynchid, *Ibaccus*, two specimens of *Patella*, Gasteropod attached to Ophiurid, and two species of Polyzoa.

Excluding Protozoa, over 200 specimens of invertebrates were obtained at this Station, belonging to about 57 species, of which 32 are new to science, including representatives of 7 new genera; 15 of the new species and 2 new genera were not obtained elsewhere.

Willemoes-Suhm writes: "Among the parasites inhabiting *Euplectella* the following were distinguished: 1, *Ægа spongiphila*, the commonest inhabitant of the Sponge; 2, *Palæmon* sp. (?), very transparent and delicate (I succeeded in getting the Zoëæ out of the eggs, by keeping the mother in a globe, and found them to be ordinary Zoëæ with, however, some appendages only, as a rule, seen at a later stage); 3, a whitish Aphroditacean Annelid, an inch in length; and 4, a small white *Pecten*. The two latter are less common than the two former; all are white and some transparent. An Ophiurid was taken with a Gasteropod attached having a likeness to a

Station 209.

gigantic *Stylifer*. Only one Lepadid Cirriped was found, attached to *Molpadia*. There were beautiful Holothurians with wheels (large and small) like those of *Chirodota* distributed in whitish patches all over the body. Very fine specimens of *Sabella* came up in long mud tubes. The Crustacea were represented by a particularly fine Stenorhynchid with long spiny legs, most of which were, however, broken off, and two other forms with one pair of legs on their backs, allied to the genus *Cymopolia*."

Organisms from the Deposit.

Diatomaceæ.—The following species of Diatoms were observed by Mr. Comber in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :—

Navicula lyra, Ehrenberg.
,, *clavata*, Gregory.
,, *prætexta*, Ehrenberg.
,, *bullata*, Norman.
,, *brasiliensis*, Grunow.
,, *indica*, Greville.
,, *baileyana*, Grunow.
,, *durandii*, Kitton.
,, *nitescens*, Ralfs.
,, *bombus*, Kutzing.
,, *pandura*, Brebisson.
,, *aspera*, Ehrenberg.
,, sp. (?).
Alloioneis antillarum, Cleve and Grunow.
Pleurosigma affine, Grunow, var. *normanni*, Ralfs.
,, *naviculacea*, Brebisson.
Nitzschia vermiculata, Castracane.
,, *obesa*, Castracane.
,, *panduriformis*, Gregory.
,, *plana*, Smith.
Synedra robusta, Ralfs.
Surirella fastuosa, Ehrenberg.
,, *recedens*, A. Schmidt.
,, *dives*, Castracane.
Campylodiscus intermedius, Greville.
,, *robertsianus*, Greville.
,, *ambiguus*, Greville (= *C. latus*, Shadbolt).
,, *biangulatus*, Greville.
,, *ornatus*, Greville.
,, *kittonianus*, Greville.
,, *undulatus*, Greville.
,, *angulatus*, Gregory.
Actinocyclus pruinosus, Castracane.
,, *clevei*, Castracane.
,, sp. (?).
Actinoptychus areolatus, A. Schmidt.
Asteromphalus brookei, Bailey.
Asteromphalus elegans, Greville (= *A. wyvillei*, Castracane).
,, *roperianus*, Ralfs.
Stictodiscus affinis, Castracane.
,, *californicus*, Greville.
Cyclotella stylorum, Brightwell.
Coscinodiscus excentricus, Ehrenberg.
,, *leptopus*, Grunow.
,, *nitidus*, Gregory.
,, *nitidulus*, Grunow.
,, *marginatus*, Ehrenberg.
,, *subtilis*, Ehrenberg.
,, *curvatulus*, Grunow.
,, ,, var. *subocellatus*, Grunow.
,, *radiatus*, Ehrenberg.
,, *apollinis*, Ehrenberg.
,, *africanus*, Janisch.
,, ,, var. *wallichiana*, Grunow.
,, *apiculatus*, Ehrenberg.
,, *nodulifer*, Janisch.
,, *reniformis*, Castracane (= *Stoschia admirabilis*, Janisch).
Pyxidicula cruciata, Ehrenberg.
Pyxilla sp. (?).
Paralia sulcata, Cleve.
Stephanopyxis superba, Grunow.
Podosira ambigua, Grunow.
,, *argus*, Grunow.
Hemidiscus cuneiformis, Wallich.
Triceratium robertsianum, Greville.
,, *latum*, Greville.
,, *favus*, Ehrenberg.
,, *fimbriatus*, Ehrenberg.
,, sp. (?).
Biddulphia tuomeyii, Roper.
,, *reticulata*, Roper.
,, sp. (?).

Surface Organisms.—The following species are recorded from the surface at this Station :— STATION 209. ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Lychnaspis longissima, Haeckel.
Psilomelissa galeata, Haeckel.
Sethoconus trochus, Haeckel.
Dictyomitra macilenta, Haeckel.

PTEROPODA (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *virgula* (Rang).
„ („) *acicula* (Rang).
Cavolinia longirostris (Lesueur).

Station 210 (Sounding 346), Manila to Samboangan (see Chart 31 and Diagram 14). STATION 210.

January 25, 1875 ; lat. 9° 26′ N., long. 123° 45′ E.
Temperature of air at noon, 83°·8 ; mean for the day, 80°·8.
Temperature of water :—

Surface,	80°·2	150 fathoms,	56°·6
50 fathoms,	78·5	Bottom,	54·1
100 „	61·5		

Depth, 375 fathoms; deposit, Green Mud, containing 36·06 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Continued sailing down the channel between Zebu and Bohol Islands during the forenoon. About noon reached a position between Bohol Island in the N., Siquijor Island in the S., and the southern extremities of the islands of Zebu and Negros to the westward, and towards the E. the island of Camiguin with its smoking volcano visible at a distance of 75 miles. At 1 P.M. got up steam, and at 1.30 P.M. shortened and furled sails and proceeded under steam to sound and trawl. At 2 P.M. sounded in 375 fathoms, put trawl over. At 4 P.M. hove up trawl with numerous specimens, and put dredge over. At 5.30 P.M. hove up dredge with several specimens. At 6 P.M. proceeded towards Camiguin Island.

The following species are recorded in the Zoological Reports from the trawl and dredge at this Station :— ANIMALS FROM TRAWL AND DREDGE.

HEXACTINELLIDA (Schulze, Zool. pt. 53).

Aphrocallistes ramosus, n.sp. One specimen ; obtained at no other locality. Recorded subsequently from Japan.

Station 210.

Alcyonaria (Wright and Studer, Zool. pt. 64).

Muriceides fragilis, n.g., n.sp. Obtained at no other locality. Only species of the genus.

Corals (Moseley, Zool. pt. 7).

Acanthocyathus spinicarens, n.sp. One specimen; obtained at no other locality.

Lophohelia tenuis, n.sp. One specimen; obtained at no other locality.

Crinoidea (Carpenter, Zool. pt. 32).

Pentacrinus alternicirrus, n.sp. (Doubtful if from this Station); obtained also at Stations 171 and 214.

,, *naresianus*, n.sp. (Doubtful if from this Station); obtained also at Stations 170, 171, 175, and 214.

Metacrinus murrayi, n.g., n.sp. One specimen (doubtful whether from Stations 192, 210, or 214).

Antedon tuberosa, n.sp. Two specimens; obtained at no other locality.

,, *distincta*, n.sp. One specimen; obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophiacantha tuberculosa, n.sp. Obtained at no other locality.

,, *abnormis*, n.sp. Obtained also at Station 207.

Echinoidea (Agassiz, Zool. pt. 9).

Dorocidaris (*Cidaris*) *papillata* (Leske). For distribution see Station 24.

Palæotropus loveni, n.sp. Several specimens; obtained at no other locality.

Linopneustes murrayi, n.g., n.sp. Obtained also at Station 232, 345 fathoms. Only species of the genus.

Gephyrea (Selenka, Zool. pt. 36).

Chætoderma militare, n.sp. One specimen; obtained at no other locality.

Myzostomida (Graff, Zool. pt. 27).

Myzostoma sp. (?). (On *Antedon tuberosa*).

Anomura (Henderson, Zool. pt. 69).

Munida militaris, n.sp., var. *curvirostris*, nov. One specimen; the species obtained also at Stations 173, 192, 200, and Amboina.

Elasmonotus debilis, n.sp. One specimen; obtained also at Station 173.

BRACHYURA (Miers, Zool. pt. 49). STATION 210.

Anamathia pulchra, n.sp. One specimen; obtained at no other locality.
Echinoplax moseleyi, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.
Oxypleurodon stimpsoni, n.g., n.sp. One specimen; obtained also at Station 192. Only species of the genus.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Semele (*Abra*) *philippinensis*, n.sp. Obtained at no other locality.
Amussium jeffreysii, n.sp. Several specimens; obtained at no other locality.

GASTEROPODA (Watson, Zool. pt. 42).

Nassa (*Aciculina*) *babylonica*, n.sp. Obtained at no other locality.
Fusus (*Metula*) *philippinarum*, n.sp. Obtained at no other locality.
Phos bathyketes, n.sp. Obtained at no other locality.
Pleurotoma (*Genota*) *atractoides*, n.sp. Obtained at no other locality.
Natica philippinensis, n.sp. Obtained at no other locality.

FISHES (Günther, Zool. pt. 57).

Neobythites macrops, n.sp. One specimen; obtained also at Station 173.
Synaphobranchus pinnatus (Gronov.). One specimen; for distribution see Station 125.

In addition to the foregoing, the Station-book records:—Pennatulid, Terebellid in Sponge, two specimens of *Pericera* (?), and two Peneid shrimps.

Excluding Protozoa, over 60 specimens of invertebrates and fishes were obtained at this Station, belonging to about 34 species, of which 27 are new to science, including representatives of 5 new genera; 19 of the new species and 2 new genera were not obtained elsewhere.

Willemoes-Suhm writes: "Among the debris of small Spatangi, which came up in such quantity, I found two specimens of *Chætoderma*, a Sipunculid first described by Lovén from the coast of Sweden, and also found on muddy ground in deep water off the Danish coast along with *Ophelia*, *Priapulus*, and *Balanoglossus*. We have taken these Sipunculids only twice previously, off St. Thomas, W.I., and off Nova Scotia, and always very few specimens; in those obtained to-day the caudal appendages, described by Lovén as retractile, were clearly visible, and the pharynx was protruded and spiny all over."

Station 210. Organisms from Surface-Nets.

Surface Organisms.—The following are recorded in the note-books from the surface :—*Peridinium*, large Diatoms, *Pyrocystis*, *Globigerina*, *Sagitta*, larval Annelids, larval Crustaceans, *Atlanta*, *Pterotrachea*, Pteropods, *Appendicularia*, young fishes and fish eggs.

Station 210A.

Station 210A (Sounding 347), Manila to Samboangan (see Chart 31).

January 26, 1875 ; lat. 9° 15′ N., long. 124° 38′ E.
Temperature of air at noon, 79°·5 ; mean for the day, 79°·7.
Temperature of water at surface, 80°·7 ; bottom, 57°·1.
Density at 60° F. at surface, 1·02520.
Depth, 185 fathoms ; deposit, Blue Mud, containing 17·00 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

In the forenoon continued under steam towards Camiguin Island. The volcano was seen to emit large volumes of steam, proceeding from the crater and several fumaroles on its slope. At noon stopped about two miles N.W. of the volcano. At 1 P.M. sounded in 185 fathoms. Sent off cutter with a party of naturalists to examine the volcano. Proceeded for anchorage off the village of Abajo to the N. of the volcano. At 1.30 P.M. stopped and came to in 6 fathoms, between the shore and a yellow sandy patch off Abajo. At 5 P.M. got up steam. At 5.30 P.M. naturalists returned from shore with several birds and geological specimens. At 6 P.M. made sail and proceeded towards Samboangan.

Station 211.

Station 211 (Sounding 348), Manila to Samboangan (see Chart 31 and Diagram 14).

January 28, 1875 ; lat. 8° 0′ N., long. 121° 42′ E.
Temperature of air at noon, 81°·8 ; mean for the day, 80°·2.
Temperature of water :—

Surface,	81·0	200 fathoms,	53·8
25 fathoms,	79·0	250 „	52·8
50 „	73·0	300 „	51·8
75 „	66·0	400 „	50·5
100 „	61·0	Bottom,	50·5
150 „	56·0		

Density at 60° F. at surface, 1·02571 ; bottom, 1·02546. Station 211.
Depth, 2225 fathoms ; deposit, Blue Mud, containing 14·63 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 8 A.M. shortened and furled sail, and proceeded under steam. At 9 A.M. sounded in 2225 fathoms. Obtained serial temperatures down to 400 fathoms. The carbonic acid was determined in bottom water, and amounted to 24·3 milligrammes per litre. Position of sounding about 31 miles due W. of Point Gooder (Mindanao), and about 35 miles S.S.W. of Station 202. At 10.50 A.M. completed observations and made all plain sail. A few boobies (*Sula*) were observed skimming over the surface of the water.

Sangboys Island distant at noon, 64 miles. Made good 107 miles. Amount of current 14 miles, direction S. 69° W.

Two Hexactinellid Sponges (*Holascus ridleyi*, n.g., n.sp., and *Hyalonema gracile*, n.sp.) are recorded in error by Schulze (Zool. pt. 53) from this Station ; they probably came from Station 271 (see Station 271).

Surface Organisms —The following are recorded in the note-books from the surface:— Organisms from Surface-Nets.
Pyrocystis, *Globigerina*, *Orbulina*, *Pulvinulina*, *Diphyes*, Echinoderm larvæ, *Sagitta*, *Alciopa*, *Tomopteris*, *Syllis* with egg-sacs, *Cypridina*, Copepods, Cirriped larvæ, *Oxycephalus*, *Squillerichthus*, *Lucifer*, *Sergestes*, *Thecæurybia* [=*Halopsyche*] *gaudichaudi* (observed to be phosphorescent), Cymbulian larva, *Appendicularia*, larvæ of *Amphioxus*.

Station 212 (Sounding 349), off Samboangan (see Chart 31). Station 212.

January 30, 1875 ; lat. 6° 45′ N., long. 122° 18′ E.
Temperature of air at noon, 80°·5 ; mean for the day, 80°·3.
Temperature of water at surface, 83°·0.
Depth, 10 fathoms ; deposit, Sand, Gravel, and Mud.

At 3 A.M. got up steam. At 4.30 A.M. weighed anchor and proceeded out of Samboangan Harbour under steam to S.E. to swing ship for deviation of compass, and errors of dipping-needle. Landed party of naturalists and officers to explore Malanipa Island. At 1 P.M. completed swinging ship. Proceeded towards Malanipa Island. Fired two guns and hoisted recall for exploring party. At 2.15 P.M. stopped about one mile N. of Malanipa Island and trawled and dredged in 10, 14, and 20 fathoms,

Station 212. numerous specimens being obtained. At 3.30 P.M. exploring party returned on board. At 3.35 P.M. proceeded towards Samboangan, anchoring there in 11 fathoms at 7.10 P.M., having had to steam against a strong tide-current.

Animals from Trawl and Dredge. The following species are recorded in the Zoological Reports from the trawl and dredge at this Station :—

Tetractinellida (Sollas, Zool. pt. 63).

Myriastra clavosa, Ridley, var. *quadrata*, nov. One specimen; the species obtained also at Stations 186 and 208.

Alcyonaria (Wright and Studer, Zool. pt. 64).

Spongodes florida (Esper). One specimen; obtained at no other locality by the Challenger. Recorded from Australia and Philippines.

„ *anguina*, n.sp. One specimen; obtained at no other locality.

„ *bicolor*, n.sp. One young specimen; obtained also in Torres Strait.

Pennatulida (Kölliker, Zool. pt. 2).

Pteroeides esperi, Herklots. Several specimens; obtained at no other locality by the Challenger. Recorded from Philippines.

Halisceptrum gustavianum, Herklots, var. *parvifolia*, Kölliker. Four specimens; obtained at no other locality by the Challenger.

Scytalium sarsi, Herklots. Five specimens; obtained at no other locality by the Challenger. Original locality unknown.

Corals (Moseley, Zool. pt. 7).

Heterocyathus philippinensis, Semper. Numerous specimens; obtained at no other locality by the Challenger.

Heteropsammia michelini, M.-Edwards and Haime. Numerous specimens; obtained at no other locality by the Challenger.

Crinoidea (Carpenter, Zool. pt. 60).

Antedon milberti (Müller). Two specimens; obtained also at Station 203.

„ *clemens*, n.sp. One specimen; obtained at no other locality.

„ *anceps*, n.sp. Three specimens; obtained at no other locality.

„ *quinduplicava*, n.sp. One specimen and fragment; obtained at no other locality.

ASTEROIDEA (Sladen, Zool. pt. 51). STATION 212.

Pentaceros turritus, Linck. Obtained also at Stations 187, 188, and Philippines.

,, *productus* (Bell), var. *tuberata*, nov. Several specimens; obtained also at Philippines. The species recorded from Billiton.

Culcita novæ-guineæ, Müller and Troschel. Obtained also at Philippines. Recorded from New Guinea and New Hanover.

Asterodiscus elegans, Gray. Obtained at no other locality by the Challenger. Recorded from China.

Choriaster granulatus, Lütken. Obtained also at Fiji.

OPHIUROIDEA (Lyman, Zool. pt. 14).

Ophiocnida pilosa, n.sp. Obtained also at Station 162.

Astrophyton exiguum (Lamarck). Obtained also at Station 190.

ECHINOIDEA (Agassiz, Zool. pt. 9).

Salmacis dussumieri, Agassiz. Obtained also at Amboina.

Clypeaster humilis (Leske). Obtained also at Amboina.

Peronella decagonalis (Lesson). For distribution see Station 172.

Lovenia elongata, Gray. Obtained also at Station 188 and Simon's Bay, Cape.

ANOMURA (Henderson, Zool. pt. 69).

Albunea microps (White), Miers. Three specimens; obtained at no other locality by the Challenger. Recorded from Sooloo Island.

Pagurus similimanus, n.sp. One specimen (in *Fusus* shell); obtained at no other locality.

Porcellanella triloba, White. Several specimens; obtained also at Station 315, 5 to 12 fathoms. Recorded from Australia and India.

Galathea elegans, White. Three specimens; obtained at no other locality by the Challenger. Recorded from Philippines, Australia, and India.

BRACHYURA (Miers, Zool. pt. 49).

Egeria arachnoides (Rumph). Several specimens; obtained also at Stations 188 and 190.

Neptunus (*Amphitrite*) *rugosus*, M.-Edwards. One specimen; obtained also at Station 208 and Torres Strait.

,, (,,) *gladiator* (Fabricius), var. *argentatus*, White. One specimen; the species obtained at Station 188.

Lissocarcinus lævis, n.sp. One specimen; obtained at no other locality.

Station 212.

Gomeza bicornis, Gray. One specimen; obtained at no other locality by the Challenger. Recorded from Indian and Pacific Oceans.

Myra darnleyensis, Haswell. Eight specimens; obtained at no other locality by the Challenger. Recorded from Darnley Island.

Leucosia haswelli, n.sp. One specimen; obtained also at Station 188.

Cymopolia jukesii, White. One specimen; obtained at no other locality by the Challenger. Recorded from Australia.

Lamellibranchiata (Smith, Zool. pt. 35).

Mactra incarnata, Deshayes. Six valves; obtained at no other locality by the Challenger. Recorded from Australia.

Venus (*Chione*) *recgonita*, n.sp. Two specimens; obtained at no other locality.

Cytherea (*Callista*) *lilacina*, Lamarck. Obtained at no other locality by the Challenger.

„ („) *roseotincta*, n.sp. Obtained at no other locality.

„ (*Caryatis*) *hebræa*, Lamarck. Single valve; obtained at no other locality by the Challenger. Recorded from Australia.

Circe sulcata, Gray. Obtained also at Fiji.

Cardium (*Acanthocardium*) *setosum*, Redfield. Obtained at no other locality by the Challenger. Recorded from China.

Cardita canaliculata, Reeve. Obtained at no other locality by the Challenger.

Pectunculus striatularis (Lamarck?), Reeve. Obtained also at Port Jackson.

Arca (*Scapharca*) *angicostata*, Reeve. Obtained at no other locality by the Challenger. Original locality unknown.

Lima squamosa, Lamarck, (juv.). One specimen; obtained also at Station VIIp.

Gasteropoda (Watson, Zool. pt. 42).

Solarium (*Architectonica*) *perspectivum* (Linné). Obtained at no other locality by the Challenger. Recorded from Amboina and Australia.

Fusus colus (Linné). Obtained at no other locality by the Challenger. Recorded from Madagascar to Malay Archipelago.

Phos roseatus, Hinds. Obtained also at Station 208 and Arrou Islands.

„ (*Strongylocera*) *angulatus*, Sowerby. Obtained at no other locality by the Challenger. Recorded from Philippines and Japan.

Mitra (*Pusia*) *cineracea*, Reeve. Obtained also at Station 162.

Terebra (*Myurella*) *undulata*, Gray. Obtained also at Fiji.

Conus (*Lithoconus*) *eburneus*, Hwass. Obtained also at Fiji.

„ („) *quercinus*, Hwass. Obtained at no other locality by the Challenger. Recorded from Indian and Pacific Oceans.

Conus (*Leptoconus*) *nisus*, Chemnitz. Obtained at no other locality by the Challenger. Recorded from Moluccas and Philippines. Station 212.

Triton (*Gutturnium*) *gracilis*, Reeve. Obtained at no other locality by the Challenger. Recorded from Australia and Philippines.

„ (*Distorsio*) *cancellinus* (De Roissy). Obtained at no other locality by the Challenger. Recorded from Philippines.

Strombus (*Gallinula*) *columba*, Lamarck. Obtained also at Station 208.

Natica seychellium, Watson. Obtained at no other locality by the Challenger. Recorded from Seychelles and Torres Strait.

Xenophora solarioïdes (Reeve). One specimen (beset with shells of *Venus*, *Ostrea*, *Trochus*, and *Terebra*); obtained also at Station 208 and Torres Strait.

Cæcum sp. (?).

Turritella (*Eglisia*) *tricarinata*, Adams and Reeve. Obtained at no other locality by the Challenger. Recorded from China Sea.

Eulima oxytata, n.sp. Obtained at no other locality.

Mucronalia xanthias, n.sp. Obtained also at Stations 172 and 186.

Philine orientalis, Adams. Obtained at no other locality by the Challenger. Recorded from eastern seas.

Polyzoa (Busk, Zool. pt. 30).

Retepora philippinensis, n.sp. One specimen; obtained at no other locality.

Phoronis (M'Intosh, Zool. pt. 75).

Phoronis buskii, n.sp. Obtained at no other locality.

Tunicata (Herdman, Zool. pts. 17 and 38).

Polycarpa pedata, n.sp. One specimen; obtained at no other locality.

Botrylloides perspicuum, n.sp. Two specimens; obtained at no other locality.

„ „ var. *rubicundum*, nov. Six specimens; obtained at no other locality.

Colella thomsoni, n.g., n.sp. A dozen specimens; obtained at no other locality.

Distaplia vallii, n.sp. Several specimens; obtained at no other locality by the Challenger. Recorded from Mediterranean (" Porcupine ").

In addition to the foregoing, the following are recorded in the Station-book:—Many *Plumulariæ*, *Synapta*, many other Holothuriæ, several Sabellids, a few other Annelids, five specimens of *Stylifer* parasitic on Holothurian, and two specimens of *Solea*.

Station 212. Excluding Protozoa, over 250 specimens of invertebrates and fishes were obtained at this Station, belonging to about 84 species, of which 22 are new to science, including representatives of 2 new genera; 17 of the new species were not obtained elsewhere.

Willemoes-Suhm writes: "Five little Stylifers were taken on the skin of a Holothurian; a *Porcellana* seemed to live between the arms of a Virgularian; a shell was found on the branches of a Plumularian, the stem of which was occupied by a Polyzoon; and a Sipunculid inhabited holes bored into the bases of the Corals *Heterocyathus* and *Heteropsammia*. There were very few Sponges. The long blue compound Ascidians, belonging to the genus *Chondrostachys*, were interesting, and there were besides specimens belonging to the Botryllidæ. The Crustacea were represented by a crab, previously taken near Tongatabu, *Pagurus*, *Porcellana*, and *Remipes*."

Organisms from Surface-Nets. Surface Organisms.—The following are recorded in the note-books from the surface :— *Sagitta*, larvæ of worms and Cirripeds in abundance, along with Copepods and other things.

At the Philippines. The expedition visited the Philippine Islands in October and November 1874, and again, after returning from Hong Kong, in January and February 1875 (for description of the islands see *Narr. Chall. Exp.*, vol. i. pp. 648–666). The following species are recorded in the Zoological Reports as having been obtained in shallow water and on shore during the stay in the vicinity of the Philippine Islands, principally at Samboangan and Zebu:—

Animals from Philippines. Tetractinellida (Sollas, Zool. pt. 63).

Craniella simillima (Bowerbank), var. (Samboangan); obtained also at Stations 163B and 186.

Tethya seychellensis (Wright). One specimen (Samboangan); obtained also at Station 186.

Alcyonaria (Wright and Studer, Zool. pt. 64).

Melitodes philippinensis, n.sp. Several specimens (Samboangan reefs); obtained at no other locality.

,, *sinuata*, n.sp. One specimen (Samboangan reefs); obtained at no other locality.

Heliopora cærulea, Blainville. (Samboangan reefs); obtained also at Station 186.

Spongodes digitata, n.sp. One specimen (Zebu reefs); obtained at no other locality.

,, *spicata*, n.sp. One specimen (Zebu reefs); obtained at no other locality.

Paranephthya capitulifera, n.g., n.sp. One specimen (Samboangan beach); obtained at no other locality. Only species of the genus.

Tubipora musica, Linné. Numerous specimens (Samboangan, beach and 10 fathoms, and Santa Cruz Major Island); obtained at no other locality by the Challenger. PHILIPPINES.

ACTINIARIA (Hertwig, Zool. pt. 73).

Cerianthus membranaceus, Spall. Two specimens (Zebu reefs); obtained at no other locality by the Challenger.

CORALS (Moseley, Zool. pt. 7).

Distichopora irregularis, n.sp. One specimen (Samboangan, 10 fathoms); obtained at no other locality.

Stylaster gracilis, M.-Edwards and Haime. (Samboangan, 30 and 10 fathoms); obtained also at Station 170.

Cladocora conferta, n.sp. Several specimens (Samboangan, 30 and 10 fathoms); obtained at no other locality.

Heteropsammia multilobata, n.sp. Numerous specimens (Samboangan, 10 fathoms); obtained at no other locality.

REEF CORALS (Quelch, Zool. pt. 46).

Stylophora flabellata, n.sp. One specimen (Samboangan); obtained at no other locality.

,, *cellulosa*, n.sp. Two specimens (Samboangan); obtained at no other locality.

Seriatopora caliendrum, Ehrenberg. (Samboangan); obtained also at Fiji.

,, *valida*, Ehrenberg. Several specimens (Samboangan); obtained at no other locality by the Challenger.

,, *contorta*, Studer. One specimen (Samboangan); obtained at no other locality by the Challenger.

,, *cervina* (Lamarck). One specimen (Samboangan); obtained also at Banda.

,, *compressa*, Studer. Two specimens (Samboangan); obtained at no other locality by the Challenger.

,, *ocellata*, Ehrenberg. Two specimens (Samboangan); obtained at no other locality by the Challenger.

,, *crassa*, n.sp. Two specimens (Mactan); obtained at no other locality.

Pocillopora acuta, Lamarck. (Mactan); obtained also at Banda and Amboina.

,, *damicornis* (Esper). One specimen (Samboangan); obtained at no other locality by the Challenger.

,, *danæ*, Verrill. One specimen (Samboangan); obtained at no other locality by the Challenger.

PHILIPPINES.

Galaxea clavus (Dana). A few specimens (Samboangan); obtained at no other locality by the Challenger.

„ *ellisii*, M.-Edwards and Haime. One specimen (Maetan); obtained at no other locality by the Challenger.

Trachyphyllia amarantus (Dana). Several specimens (Maetan); obtained at no other locality by the Challenger.

Symphyllia sinuosa (Quoy and Gaimard). Two specimens (Samboangan); obtained at no other locality by the Challenger.

Hydnophora tenella, n.sp. One specimen (Samboangan); obtained at no other locality.

Astræa fragilis, Dana. (Maetan); obtained at no other locality by the Challenger.

„ *ordinata*, Verrill. One specimen (Maetan); obtained at no other locality by the Challenger.

Goniastræa grayi, M.-Edwards and Haime. One specimen (Maetan); obtained at no other locality by the Challenger.

Cyphastræa pleiades (Ellis and Solander). One specimen (Maetan); obtained at no other locality by the Challenger.

„ *microphthalma* (Lamarck). One specimen (Maetan); obtained at no other locality by the Challenger.

„ *brueggemanni*, n.sp. Several specimens (Maetan); obtained at no other locality.

Cycloseris distorta (Michelin). Two specimens (Santa Cruz Major, 10 fathoms); obtained at no other locality by the Challenger.

„ *tenuis* (Dana). One specimen (Samboangan); obtained at no other locality by the Challenger.

„ *cyclolites* (Lamarck). Two specimens (Samboangan and Santa Cruz Major, 10 fathoms); obtained at no other locality by the Challenger.

„ *freycineti* (M.-Edwards and Haime). Two specimens (Santa Cruz Major, 10 fathoms); obtained at no other locality by the Challenger.

„ *sinensis*, M.-Edwards and Haime. Four specimens (Santa Cruz Major, 10 fathoms); obtained at no other locality by the Challenger.

„ *discus*, n.sp. Two specimens (Santa Cruz Major, 10 fathoms); obtained at no other locality.

Psammocora ramosa, n.sp. One specimen (Samboangan); obtained at no other locality.

Fungia patella (Ellis and Solander). One specimen (Mactan); obtained also at Banda and Amboina.

,, *repanda*, Dana. (Mactan); obtained also at Banda and Amboina.

,, *paumotensis*, Stutchbury. Numerous specimens (Samboangan); obtained also at Tahiti.

Halomitra tiara, Verrill. One specimen (Mactan); obtained at no other locality by the Challenger.

Rhodopsammia parallela, Semper. Several specimens (Samboangan, 30 fathoms); obtained also at Station 190.

Dendrophyllia equiserialis (M.-Edwards and Haime). One specimen (Samboangan); obtained at no other locality by the Challenger.

Madrepora securis, Dana. Two specimens (Samboangan); obtained also at Banda.

,, *manni*, n.sp. One specimen (Samboangan); obtained at no other locality.

,, *canalis*, n.sp. One specimen (Samboangan); obtained at no other locality.

,, *austera*, Dana. One specimen (Mactan); obtained at no other locality by the Challenger.

,, *aspera*, Dana. Several specimens (Mactan); obtained at no other locality by the Challenger.

,, *tenuis*, Dana. Numerous specimens (Samboangan); obtained at no other locality by the Challenger.

,, *rosacea*, Esper. One or two specimens (Samboangan); obtained also at Ternate.

,, *aculeus*, Dana. One specimen (Samboangan); obtained at no other locality by the Challenger.

,, *angulata*, n.sp. One specimen (Samboangan); obtained at no other locality.

,, *parilis*, n.sp. Several specimens (Samboangan, 10 fathoms); obtained also at Tahiti (?).

,, *prostrata*, Dana. One specimen (Samboangan); obtained at no other locality by the Challenger.

Montipora rigida, Verrill. One specimen (Mactan); obtained at no other locality by the Challenger.

,, *irregularis*, n.sp. (Samboangan); obtained at no other locality.

,, *exesa*, Verrill. One specimen (Samboangan); obtained at no other locality by the Challenger.

,, *lima* (Lamarck). One specimen (Samboangan); obtained at no other locality by the Challenger.

,, *erosa* (Dana). One specimen (Mactan); obtained at no other locality by the Challenger.

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Montipora effusa (Dana). One specimen (Samboangan); obtained at no other locality by the Challenger.

Porites palmata, Dana. A few specimens (Samboangan); obtained also at Amboina.

„ *explanata*, n.sp. One specimen (Samboangan); obtained at no other locality.

„ *lutea*, M.-Edwards and Haime. One specimen (Mactan); obtained at no other locality by the Challenger.

„ *mirabilis*, n.sp. One specimen (Mactan); obtained at no other locality.

Goniopora pedunculata, Quoy and Gaimard. One specimen (Mactan); obtained at no other locality by the Challenger.

Rhodaræa tenuidens, n.sp. One specimen (Santa Cruz Major, 10 fathoms); obtained also at Amboina.

„ *calicularis* (Lamarck). One specimen (Samboangan); obtained at no other locality by the Challenger.

Tichopora tenella, n.g., n.sp. One specimen (Samboangan); obtained at no other locality. Only species of the genus.

Millepora murrayi, n.sp. Several specimens (Samboangan); obtained at no other locality.

„ *gonagra*, M.-Edwards and Haime. One specimen (Samboangan); obtained also at Fiji and Tahiti.

HYDROIDA (Allman, Zool. pt. 20).

Plumularia dolichotheca, n.sp. (Samboangan, 10 fathoms); obtained at no other locality.

Acanthella effusa (Busk). (Samboangan, 10 fathoms); obtained also at Cape York.

Aglaophenia macgillivrayi (Busk). (Samboangan, 10 fathoms); obtained at no other locality by the Challenger.

„ *coarctata*, n.sp. (Samboangan, 10 fathoms); obtained at no other locality.

Lytocarpus secundus, Kirchenpauer. (Samboangan, 10 fathoms); obtained at no other locality by the Challenger. Recorded from South Sea, China Sea, and Pelew Islands.

„ *spectabilis*, n.sp. (Samboangan, 10 fathoms); obtained also at Station 186.

„ *longicornis* (Busk). (Samboangan, 10 fathoms); obtained at no other locality by the Challenger.

CRINOIDEA (Carpenter, Zool. pt. 60).

Antedon disciformis, n.sp. Six specimens and fragment (Zebu reefs); obtained at no other locality.

Antedon conjungens, n.sp. Two specimens (Zebu reefs); obtained at no other locality. PHILIPPINES.

Actinometra pectinata (Retzius). Two specimens (Samboangan, 10 fathoms); obtained also at Cape York.

,, *distincta*, n.sp. One specimen (Samboangan, 10 fathoms); obtained at no other locality.

,, *rotalaria* (Lamarck). Two specimens (Samboangan, 10 fathoms); obtained at no other locality by the Challenger. Recorded from Australia.

,, *coppingeri*, Bell. One specimen (Samboangan, 10 fathoms); obtained also at Banda.

,, *nobilis*, n.sp. Five specimens (Samboangan, 10 fathoms); obtained also at Station 208.

,, *parvicirra* (Müller). Seven specimens (Samboangan, 10 fathoms); for distribution see Station 174.

ASTEROIDEA (Sladen, Zool. pt. 51).

Archaster typicus, Müller and Troschel. (Samboangan and Zebu, reefs to 10 fathoms); obtained also at Station 200 and Fiji.

Luidia aspera, n.sp. (Samboangan, 10 fathoms); obtained also at Stations 204 and 219.

Pentaceros turritus, Linck. (Samboangan and Zebu, reefs to 10 fathoms); obtained also at Stations 187, 188, and 212.

,, *productus* (Bell), var. *tuberata*, nov. (Samboangan, 10 fathoms); obtained also at Station 212.

Pentaceropsis obtusatus (St. Vincent). (Zebu reefs); obtained at no other locality by the Challenger. Recorded from Mauritius (?).

Culcita novæ-guineæ, Müller and Troschel. (Zebu reefs); obtained also at Station 212.

Asterina exigua (Lamarck). (Samboangan, 10 fathoms); obtained also at the Cape and Port Jackson.

,, *cepheus* (Müller and Troschel). (Samboangan, 10 fathoms); obtained at no other locality by the Challenger. Recorded from Indian and Pacific Oceans.

Linckia miliaris (Linck). (Zebu reefs); obtained also at Fiji.

Nardoa tuberculata, Gray. (Samboangan and Zebu, reefs to 10 fathoms); obtained at no other locality by the Challenger. Recorded from Philippines.

Acanthaster echinites (Ellis and Solander). (Zebu reefs); obtained also at Fiji.

OPHIUROIDEA (Lyman, Zool. pt. 14).

Ophiolepis cincta, Müller and Troschel. (Samboangan); obtained also at Station 186.

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Ophiactis savignyi (Müller and Troschel). (Samboangan, 10 fathoms); obtained also at Station 208.

Ophiocoma scolopendrina (Lamarck). (Samboangan Bank and Zebu reefs); obtained also at the Cape, Tongatabu, and Fiji.

,, *erinaceus*, Müller and Troschel. (Samboangan Bank); obtained also at Sandwich Islands.

Ophiomastix caryophyllata, Lütken. (Zebu reefs); obtained also at Fiji.

Ophiothrix longipeda (Lamarck). (Samboangan, 10 fathoms); for distribution see Station 172.

,, *ciliaris* (Lamarck) (?). (Zebu); obtained also at Station 209.

,, *stelligera*, Lyman. (Samboangan); obtained also at Station 186, Fiji, and Arafura Sea.

,, *propinqua*, Lyman (?). (Samboangan); obtained also at Station 172 (?) and Fiji.

,, *nereidina* (Lamarck). (Samboangan, 10 fathoms); obtained at no other locality by the Challenger.

,, *striolata*, Grube. (Samboangan, 10 fathoms); obtained also at Station 208.

ECHINOIDEA (Agassiz, Zool. pt. 9).

Phyllacanthus baculosa (Lamarck). (Samboangan, 10 fathoms); obtained also at tation 201.

Diadema setosum, Gray. (Zebu); obtained also at Cape Verdes, St. Thomas, and Tahiti.

Echinothrix calamaris (Pallas). (Zebu reefs); obtained also at Fiji and Tahiti.

Asthenosoma grubii, n.sp. (Samboangan, 10 fathoms); obtained at no other locality.

Echinometra lucunter (Leske). (Samboangan and Zebu, 10 fathoms); for distribution see Station 172.

Pseudoboletia indiana (Michelin). (Samboangan, 10 fathoms); obtained at no other locality by the Challenger.

Salmacis bicolor, Agassiz. (Samboangan, 10 fathoms); obtained at no other locality by the Challenger.

,, *sulcata*, Agassiz. (Zebu); obtained at no other locality by the Challenger.

Mespilia globulus, Agassiz. (Samboangan, 10 fathoms); obtained at no other locality by the Challenger.

Toxopneustes pileolus (Lamarck). (Samboangan, 10 fathoms); obtained also at Sandwich Islands.

Hipponoë variegata (Leske). (Samboangan, 10 fathoms); obtained also at Port Jackson and Fiji.

HOLOTHURIOIDEA (Théel, Zool. pt. 39). PHILIPPINES.

Synapta beselii, Jæger. Several specimens (Zebu reefs); obtained also at Station 177, Amboina, and Tahiti.

„ *glabra*, Semper. Several specimens (Zebu reefs); obtained at no other locality by the Challenger. Recorded from Philippine, Marianne (?), and Fiji Islands.

Stichopus variegatus, Semper. One specimen (Zebu reefs); obtained at no other locality by the Challenger. Recorded from Indian and Pacific Oceans.

Holothuria vagabunda, Selenka. One specimen (Samboangan); obtained also at Station 172 and Fiji.

„ *curiosa*, Ludwig. One specimen (Samboangan); obtained at no other locality by the Challenger. Recorded from Bowen and Fiji.

ANNELIDA (M'Intosh, Zool. pt. 34).

Eunice aphroditois, Pallas. (Samboangan, between tide-marks); obtained also at Port Jackson.

MYZOSTOMIDA (Graff, Zool. pt. 61).

Myzostoma longicirrum, n.sp. (On *Actinometra parvicirra*).

„ *platypus*, n.sp. (On *Actinometra nobilis*).

CIRRIPEDIA (Hoek, Zool. pt. 25).

Tetraclita coerulescens (Spengler). Several specimens (Samboangan, 10 fathoms); obtained at no other locality by the Challenger.

Balanus sp. (?) (var. of *Balanus amphitrite*, Darwin ?). One specimen (attached to specimen of *Tetraclita*).

STOMATOPODA (Brooks, Zool. pt. 45).

Lysiosquilla maculata (Fabricius). Two specimens (Samboangan); obtained also at Amboina.

Gonodactylus chiragra, Latreille. Three specimens (Samboangan and Samboangan Bank); obtained also at St. Thomas, Bermuda, and off Cape St. Roque.

„ *glabrous*, n.sp. One specimen (Samboangan reefs); obtained at no other locality.

MACRURA (Spence Bate, Zool. pt. 52).

Acanthosoma macrotelsonis, n.sp. (Samboangan); obtained at no other locality.

PHILIPPINES.

Parathanas decorticus, n.g., n.sp. One specimen (off Sibago, 80 fathoms); obtained at no other locality. The only other species of the genus (*Parathanus immaturus*) was taken at the surface in Zebu Harbour.

Alpheus crinitus, Dana. One specimen (Samboangan reefs); obtained also at Station 208.

Latreutes planus, n.sp. One specimen (off Sibago); obtained at no other locality.

„ *unidentatus*, n.sp. One specimen (off Sibago); obtained at no other locality.

Caricyphus cornutus, n.g., n.sp. One specimen (near Samboangan); obtained at no other locality.

Anebocaris quadroculus, n.g., n.sp. Four specimens (off Sibago and Zebu Harbour); obtained also at Station 200, Port Jackson, and China Sea.

Bithynis lar (Fabricius). Five specimens (Pasananca, Mindanao, and near Samboangan); obtained also at Fiji, Banda, and Tahiti.

Oodeopus serratus, n.g., n.sp. (Sibago); obtained also off Cape Howe and New Hebrides.

ANOMURA (Henderson, Zool. pt. 69).

Birgus latro (Linné). Several specimens (Philippines); obtained also at Ternate.

Pagurus striatus, Latreille. One specimen (Zebu reefs); obtained also at Station 204.

BRACHYURA (Miers, Zool. pt. 49).

Naxia hirta (M.-Edwards). One specimen (Samboangan, 15 fathoms); obtained at no other locality by the Challenger. Recorded from East Africa and Mascarene Islands.

Lambrus contrarius (Herbst). One specimen (Samboangan, 10 fathoms); obtained at no other locality by the Challenger. Recorded from East Indies and Mauritius.

Atergatis floridus (Linné). One specimen (Zebu reefs); obtained also at Ternate.

Xantho bidentatus, M.-Edwards. One specimen (Samboangan, beach); obtained at no other locality by the Challenger. Recorded from Sandwich and Samoan Islands.

Carpilodes bellus (Dana). One specimen (Samboangan, beach); obtained at no other locality by the Challenger. Recorded from Samoa, Paumotu, and Keeling Islands.

Actæodes tomentosus (M.-Edwards). Several specimens (Samboangan, beach); obtained at no other locality by the Challenger. Recorded from Red Sea and Mauritius to Sandwich Islands.

Leptodius exaratus, var. *sanguineus* (M.-Edwards). Several specimens (Samboangan, beach and 10 fathoms); obtained at no other locality by the Challenger. Recorded from Indo-Pacific region. PHILIPPINES.

Phymodius monticulosus (Dana). Several specimens (Samboangan, beach); obtained at no other locality by the Challenger. Recorded from Indo-Pacific region.

Pilumnus scabriusculus, Adams and White (?). One specimen (Samboangan, beach); obtained at no other locality by the Challenger. Recorded from eastern seas.

Trapezia cymodoce (Herbst) (?). Two specimens (Samboangan, 10 fathoms); obtained also at Station 172.

,, *rufopunctata* (Herbst). Two specimens (Samboangan, 10 fathoms); obtained also at Sandwich Islands (var.). Recorded from Oriental regions.

Neptunus (*Achelous*) *granulatus* (M.-Edwards). One specimen (Samboangan, 10 fathoms); obtained also at Admiralty Islands.

Thalamita prymna (Herbst). One specimen (Samboangan); obtained also at Station 172 and Ternate.

,, *stimpsoni*, M.-Edwards. One specimen (Samboangan, 10 fathoms); obtained also at Station 172.

Thelphusa sinuatifrons, M.-Edwards (?), var. Two specimens (Pasananca, river); obtained at no other locality by the Challenger.

Ocypoda ceratophthalma (Pallas). Several young specimens (Samboangan, 10 fathoms); obtained also at Fiji and Raine Island.

Gelasimus rubripes, Jacquinot and Lucas. One specimen (Samboangan, 10 fathoms); obtained at no other locality by the Challenger.

,, *annulipes*, M.-Edwards. Three specimens (Samboangan, 10 fathoms); obtained also at Fiji.

Varuna litterata (Fabricius). One specimen (Pasananca, river); obtained also at Banda and New Guinea.

Helice latreillei, M.-Edwards, var. One specimen (Samboangan, 10 fathoms); obtained also at Fiji.

Matuta victrix, Fabricius. Four specimens (Samboangan, 10 to 20 fathoms); obtained at no other locality by the Challenger.

,, *banksii*, Leach. Three specimens (Samboangan, 10 fathoms); obtained at no other locality by the Challenger.

Ixa cylindrus (Fabricius), var. *megaspis*, Adams and White. One specimen (Manila, 1 fathom—presented); obtained at no other locality by the Challenger. Recorded from Indo-Pacific region.

Philippines.

Lamellibranchiata (Smith, Zool. pt. 35).

Perna samoensis, Baird. (Samboangan, 10 fathoms); obtained also at Sandwich Islands. Recorded from Samoa and Keeling Islands.

Pecten lemniscatus, Reeve (?). One specimen (Samboangan, 10 fathoms); obtained at no other locality by the Challenger.

Gasteropoda (Watson, Zool. pt. 42).

Haliotis varia, Linné. (Samboangan, 10 fathoms); obtained at no other locality by the Challenger. Recorded from East Africa to Australia.

Trochus (*Chrysostoma*) *paradoxus*, Born. (Samboangan, 10 fathoms); obtained also at Admiralty Islands. Recorded from Mauritius, Nicobars, Philippines, and New Caledonia.

Nerita chamæleon, Linné. (Samboangan, 10 fathoms); obtained at no other locality by the Challenger. Recorded from Indian Ocean and Malay Archipelago.

Murex (*Phyllonotus*) *endivia*, Lamarck. (Zebu, shore); obtained also at Station 208.

Voluta (*Vespertilio*) *vespertilio*, Linné, var. *pellis serpentis*, Lamarck. (Samboangan, 10 fathoms); obtained at no other locality by the Challenger. Recorded from Indian Ocean, Moluccas, and Papua.

Conus (*Cylindrella*) *sulcatus*, Hwass. (Zebu, shore); obtained at no other locality by the Challenger. Recorded from China, East Indies, and Indian Ocean.

Cypræa cylindrica, Born. (Samboangan, 10 fathoms); obtained at no other locality by the Challenger. Recorded from Indian and Pacific Oceans.

Polyplacophora (Haddon, Zool. pt. 43).

Schizochiton incisus (Sowerby). Three specimens (Samboangan); obtained at no other locality by the Challenger. Recorded from Australia and Philippines.

Cryptoplax oculatus (Quoy and Gaimard). (Samboangan, 10 fathoms); obtained at no other locality by the Challenger. Recorded from New Guinea and Vanikoro.

Nudibranchiata (Bergh, Zool. pt. 26).

Ceratosoma cornigerum (Adams), var. (?). One specimen (Samboangan, 10 fathoms); obtained at no other locality by the Challenger. Recorded from Indian Ocean.

Discodoris morphæa, Bergh. One specimen (Samboangan, 10 fathoms); obtained at no other locality by the Challenger. Recorded from Philippines. PHILIPPINES.

Platydoris eurychlamys, Bergh. One specimen (Samboangan, 10 fathoms); obtained also at Station 172.

POLYZOA (Busk, Zool. pts. 30 and 50; Waters, pt. 79).

Biflustra savartii (Audouin). (Samboangan, 10 fathoms); obtained at no other locality by the Challenger.

Retepora producta, n.sp. (Samboangan, 10 fathoms); obtained also at Station 172.

,, *simplex*, n.sp. (Samboangan, 10 fathoms); obtained also at Admiralty Islands.

Escharoides occlusa, n.sp. (Samboangan, 10 fathoms); obtained also at Stations 148 and 186. [Waters calls it *Lepralia occlusa* (Busk)].

Adeonella polymorpha, n.g., n.sp. (Samboangan, 10 fathoms); obtained at no other locality.

Cellepora samboangensis, n.sp. (Samboangan, 10 fathoms); obtained at no other locality.

Crisia denticulata (Lamarck), var. *gracilis*, nov. (Off Zebu); obtained at no other locality.

BRACHIOPODA (Davidson, Zool. pt. 1).

Lingula anatina, Lamarck. Many specimens (Samboangan, beach); obtained at no other locality by the Challenger. Recorded from Timor, Fiji, and Philippines.

Megerlia sanguinea (Chemnitz). One specimen (Samboangan, 10 fathoms); obtained at no other locality by the Challenger. Recorded from Australia, Tongatabu, Zebu, Japan, Honolulu, and Tahiti.

TUNICATA (Herdman, Zool. pt. 38).

Cystodytes philippinensis, n.sp. Three specimens (Samboangan, 10 fathoms); obtained at no other locality.

Aplidium fumigatum, n.sp. One specimen (Zebu reefs); obtained also at Station 149.

Leptoclinum moseleyi, n.sp. One specimen (Samboangan, 10 fathoms); obtained at no other locality.

Synstyela incrustans, n.sp. One specimen (Samboangan, 10 fathoms); obtained also at Station 313, 55 fathoms.

FISHES (Günther, Zool. pts. 6 and 78).

Chiloscyllium indicum, Gm. (Manila); obtained at no other locality by the Challenger.

PHILIPPINES.

Acanthurus hepatus, Linné. (Samboangan); obtained at no other locality by the Challenger.

Platycephalus sp. (?), young. (Straits near Zebu, 18 fathoms); obtained also at Station 203.

Gobius echinocephalus, Rüpp. (Zebu); obtained at no other locality by the Challenger.

Ophiocephalus vagus, Peters. (Manila); obtained at no other locality by the Challenger.

Duymæria flagellifera, C.V. (Samboangan); obtained at no other locality by the Challenger.

Rhomboidichthys pavo, Bleeker. (Malanipa); obtained at no other locality by the Challenger.

„ *spilurus*, n.sp. (Straits of Zebu, 18 fathoms); obtained also at Station 188.

Barbus maculatus, C.V., var. (Pasananca); obtained at no other locality by the Challenger.

Rasbora philippina, n.sp. (Pasananca, river); obtained at no other locality.

Muræna richardsoni, Bleeker. (Zebu reefs and Samboangan); obtained also at Tahiti.

„ *nebulosa*, Ahl. (Zebu reefs); obtained also at Tahiti.

„ sp. (?), young. (Zebu reefs).

Balistes verrucosus, Bl. Schn. (Zebu reefs); obtained at no other locality by the Challenger.

Monacanthus pardalis, Rüpp. (Zebu reefs); obtained at no other locality by the Challenger.

Chilomycterus orbicularis, Bl. (Straits near Zebu, 18 fathoms); obtained at no other locality by the Challenger.

Branchiostoma belcheri, Gray. (Samboangan); obtained at no other locality by the Challenger.

In the foregoing list 215 species are enumerated, of which 57 are new to science, including representatives of 8 new genera; 43 of the new species and 2 new genera were not obtained elsewhere.

ORGANISMS FROM SURFACE NETS.

Surface Organisms.—The following species are recorded in the Zoological Reports from the surface in the vicinity of the Philippines:—

OSTRACODA (Brady, Zool. pt. 3).

Cypridina formosa, Dana (?).

Philomedes gibbosa (Dana).

COPEPODA (Brady, Zool. pt. 23).

Eucalanus attenuatus, Dana.

Eucalanus setiger, n.sp.

Rhincalanus cornutus, Dana.

Undina vulgaris, Dana.

„ *darwinii*, Lubbock.

Scolecithrix danæ (Lubbock).

Euchæta prestandreæ, Philippi.

Candace pectinata, Brady.
„ *pachydactyla*, Dana.
„ *truncata*, Dana.
Corynura gracilis, n.g., n.sp.
„ *barbata*, n.g., n.sp.
Acartia laxa, Dana.
„ *denticornis*, n.sp.
Temora dubia (Lubbock).
Centropages furcatus (Dana).
„ *violaceus* (Claus).
Calanopia elliptica, Dana.
Pontella acuta, Dana.
„ *acutifrons* (Dana).
„ *plumata* (Dana).
„ *lævidentata*, n.sp.
„ *kröyeri*, n.sp.
„ *elephas*, n.sp.
Setella gracilis, Dana.
Corycæus varius, Dana.
„ *venustus*, Dana.
Copilia mirabilis, Dana.
Oncæa obtusa (Dana).
Pachysoma punctatum, Claus.
Saphirina ovalis, Dana.
„ *inæqualis*, Dana.
„ *opalina*, Dana.
„ *gemma*, Dana.
„ *sinuicauda*, n.sp.
Hessella cylindrica, n.g., n.sp.

Amphipoda (Stebbing, Zool. pt. 67).

Hyperia luzoni, n.sp.
Parascelus zebu, n.sp.
Schizoscelus ornatus, Claus.
Ampelisca zamboangæ, n.sp.
Caprella equilibra, Say. Philippines.
Leptocotis mindanaonis, n.sp.
Podocerus validus (Dana).

Cumacea (Sars, Zool. pt. 55).

Nannastacus suhmii, n.sp.
Campylaspis pacifica, n.sp.

Schizopoda (Sars, Zool. pt. 37).

Euphausia gracilis, Dana.
„ *pellucida*, Dana.
Thysanopoda tricuspidata, M.-Edwards.
Stylocheiron carinatum, n.g., n.sp.

Macrura (Spence Bate, Zool. pt. 52).

Phyllosoma philippinense, n.sp.
Lucifer typus, Thompson.
„ *reynaudii*, M.-Edwards.
Sestertius duplicidentes, n.g., n.sp.
Kyptocaris stylofrontalis, n.g., n.sp.
Zoontocaris approximus, n.g., n.sp.
Parathanas immaturus, n.g., n.sp.

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *virgula* (Rang).
„ („) *acicula* (Rang).

Tunicata (Herdman, Zool. pt. 76).

Salpa runcinata-fusiformis, Chamisso—Cuvier.

In addition, the following are recorded in the note-books:—*Pyrocystis*, larvæ of *Chirodota*, *Glycera*, Annelid larvæ, larvæ of *Balanoglossus*, Planarians, Cirriped larvæ, larvæ of *Squilla*, *Sergestes*, Zoëæ, *Styliola*, *Limacina*.

Philippines.

Willemoes-Suhm writes: "I found among the surface things taken while at anchor off Samboangan, the *Chirodota* larva with twelve-spoked wheels. I discovered several Nauplius-stages of *Limulus*, which I shall describe in detail later on. [This turned out eventually to be a Cirriped larva]. The last stage of the *Tornaria-Balanoglossus* larva, that in which the proboscis and its two eyes are developed, as figured by Metschnikoff, was not uncommon in the water, showing that there must be a *Balanoglossus* somewhere about. Larvæ of Planarians and Annelids were plentiful, and a transparent *Glycera* was found swimming at the surface."

February 6 and 7, 1875.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface of the Celebes Sea, between Samboangan and Station 213:—

Amphipoda (Stebbing, Zool. pt. 67).

Phronimella elongata, Claus.
Brachyscelus inæquipes (Dana ?).

Schizopoda (Sars, Zool. pt. 37).

Thysanopoda tricuspidata, M.-Edwards.

Macrura (Spence Bate, Zool. pt. 52).

Zoontocaris approximus, n.g., n.sp.
Oodeopus longispinus, n.g., n.sp.

Pelagic Hemiptera (White, Zool. pt. 19).

Halobates princeps, n.sp.
,, *germanus*, n.sp.

In addition, the following are recorded in the note-books:—*Pyrocystis*, Algæ (*Trichodesmium*), compound Radiolaria, swimming Actinian and larvæ, Hydroid larvæ, small Medusæ, *Diphyes*, *Cydippe*, Pluteus, *Bipinnaria asterigera*, *Sagitta*, *Tomopteris*, *Alciopa*, larval Annelids, larvæ of *Sipunculus*, Dendrocœlous Planarians, *Corycæus*, *Saphirina*, *Copilia*, *Caprella*, *Phronima*, *Oxycephalus*, *Squillerichthus*, *Lucifer*, Caridid larvæ, Zoëæ, Megalopæ, larvæ of Acurid Mollusc (*Pontolimax* ?), *Atlanta*, *Pterotrachea*, *Styliola*, *Hyalæa* [= *Cavolinia*], *Doliolum*, *Leptocephalus*.

Moseley writes: "A young oval Planarian had eyespots over the brain, and also a set of small eyespots ranged along the whole anterior margin. A fragment of a Hydroid and a *Caprella* were probably both from the ship's bottom."

Station 213.

Station 213 (Sounding 350), Samboangan to New Guinea (see Chart 31 and Diagram 14).

February 8, 1875; lat. 5° 47′ N., long. 124° 1′ E.
Temperature of air at noon, 83°·0; mean for the day, 80°·7.

Temperature of water :— STATION 213.

Surface,	83·0°	500 fathoms,	41·2°
50 fathoms,	77·8	600 „	40·0
100 „	65·0	700 „	39·2
150 „	52·5	800 „	38·6
200 „	49·3	900 „	38·6
250 „	47·3	1100 „	38·6
300 „	45·7	1300 „	38·6
350 „	44·2	1500 „	38·6
400 „	43·2	Bottom,	38·6

Density at 60° F. :—

Surface,	1·02475	100 fathoms,	1·02569
50 fathoms,	1·02553, 1·02521, 1·02545	200 „	1·02567
		Bottom,	1·02567

Depth, 2050 fathoms ; deposit, Blue Mud, containing 1·75 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

A slight breeze sprang up before daybreak, and at 3.50 A.M. there was a squall accompanied by rain and lightning. At 11 A.M. shortened and furled sails, and proceeded under steam to sound. At noon sounded in 2050 fathoms. At 1.30 P.M. put over trawl, veering 2700 fathoms. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 50 fathoms, and amounted to 29·8 milligrammes per litre. At 5 P.M. commenced heaving in trawl, which came up at 7.30 P.M. containing a few specimens and several hardened pieces of clay, in which fragments of wood were imbedded. Proceeded under steam.

Balat Island distant at noon, 81 miles. Made good 26 miles. Amount of current 8 miles, direction S. 30° W.

The following species are recorded in the Zoological Reports from the trawl at this Station :— ANIMALS FROM TRAWL.

SCHIZOPODA (Sars, Zool. pt. 37).

Thysanopoda cristata, n.sp. One specimen (probably not from bottom) ; obtained at no other locality.

MACRURA (Spence Bate, Zool. pt. 52).

Hemipenæus spinidorsalis, n.g., n.sp. One specimen ; obtained also at Station 133.

Aristeus armatus, n.sp. One specimen ; obtained also at Stations 133, 184, 237, 246, 276, and 323.

Acanthephyra acutifrons, n.sp. One specimen ; obtained also at Stations 191 and 214.

Station 213. Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Buccinosphæra invaginata, Haeckel.
Chænicosphæra nassiterna, Haeckel (?).
Psilomelissa galeata, Haeckel.
Sethoconus trochus, Haeckel.
Dictyomitra macilenta, Haeckel.

Pteropoda (Pelseneer, Zool. pt. 65).

Cavolinia longirostris (Lesueur).
,, *globulosa* (Rang).

Fishes (Günther, Zool. pt. 78).

Psenes cyanophrys, C.V.

In addition, the following are recorded in the note-books :—*Peridinium*, *Globigerina*, two species of Ctenophoræ, Echinoderm and other larvæ, *Halobates*, *Pterotrachea*, *Salpa*, *Appendicularia*, *Fritillaria*, *Amphioxus*. A shark was seen while trawling.

Station 214.

Station 214 (Sounding 352), Samboangan to New Guinea (see Chart 31 and Diagram 15).

February 10, 1875 ; lat. 4° 33′ N., long. 127° 6′ E.
Temperature of air at noon, 81°·8 ; mean for the day, 80°·8.
Temperature of water :—

	°		°
Surface, ...	80·5	200 fathoms, . . .	48·7
25 fathoms, . . .	79·1	225 ,, . . .	47·8
50 ,, . . .	73·0	250 ,, . . .	46·8
75 ,, . . .	66·0	275 ,, . . .	45·9
100 ,, . . .	60·0	300 ,, . . .	45·2
125 ,, . . .	54·5	350 ,, . . .	43·9
150 ,, . . .	51·6	400 ,, . . .	43·0
175 ,, . . .	50·0	Bottom, . . .	41·8

Density at 60° F. at surface, 1·02551 ; bottom, 1·02562.
Depth, 500 fathoms ; deposit, Blue Mud, containing 34·34 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.45 A.M. the Meangis Islands were visible ahead. Sailed to the W. of them. At 8 A.M. got up steam. At 8.30 A.M. shortened and furled sails, and proceeded under steam. Sounded in 500 fathoms. Put trawl over. Later in forenoon a canoe, carrying a Dutch flag, full of men and boys, natives of the islands, came alongside with birds and mats to exchange for tobacco. At 12.30 P.M. hove up trawl with numerous specimens. Sent down trawl a second time. Obtained serial temperatures down to the bottom

The carbonic acid was determined in surface water, and amounted to 25·1 milligrammes per litre. At 3.30 P.M. trawl came up with a few specimens. At 3.45 P.M. made all plain sail. At sunset had a view of Karekelang, Salibaboe, and Kabruang, the three principal islands of the Tulur group. STATION 214.

Distance at noon from Lord North Island, 205 miles. Made good 113 miles. Amount of current 38 miles, direction S. 16° W.

The following species are recorded in the Zoological Reports from the trawl at this Station :— ANIMALS FROM TRAWL.

MONAXONIDA (Ridley and Dendy, Zool. pt. 59).

Esperiopsis challengeri, n.sp., var. *meangensis*, nov. Three fragments ; the species obtained also at Station 196.

HEXACTINELLIDA (Schulze, Zool. pt. 53).

Aulochone lilium, n.g., n.sp. One specimen ; obtained at no other locality. The only other species of the genus (*Aulochone cylindrica*) was taken at Station 171.

ALCYONARIA (Wright and Studer, Zool. pt. 64).

Dasygorgia squarrosa, n.sp. Fragments ; obtained at no other locality.

CORALS (Moseley, Zool. pt. 7).

Stylaster sp. (?). Fragment.

Astylus subviridis, n.g., n.sp. One specimen ; obtained at no other locality. Only species of the genus.

HYDROIDA (Allman, Zool. pt. 70).

Sertularia producta, n.sp. One specimen ; obtained at no other locality.

CRINOIDEA (Carpenter, Zool. pts. 32 and 60).

Pentacrinus alternicirrus, n.sp. Several specimens ; obtained also at Stations 171 and 210 (?).

„ *naresianus*, n.sp. Six specimens ; obtained also at Stations 170, 171, 175, and 210 (?).

Metacrinus murrayi, n.g., n.sp. One specimen (doubtful whether from Station 192, 210, or 214).

„ *varians*, n.g., n.sp. Three specimens ; obtained also at Station 170A (?).

„ *moseleyi*, n.g., n.sp. Two specimens ; obtained at no other locality.

Station 214. *Metacrinus wyvillii*, n.g., n.sp. Two specimens and fragments; obtained also at Station 170A.

,, *costatus*, n.g., n.sp. Two specimens; obtained at no other locality.

Antedon valida, n.sp. Three specimens; obtained at no other locality.

,, *gracilis*, n.sp. Five specimens; obtained at no other locality.

,, *aculeata*, n.sp. One specimen; obtained at no other locality.

,, *acæla*, n.sp. Several specimens; obtained at no other locality.

,, *lævis*, n.sp. One specimen; obtained at no other locality.

,, *angusticalyx*, n.sp. Several specimens; obtained at no other locality.

Promachocrinus naresi, n.g., n.sp. One specimen; obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophiozona depressa, n.sp. Obtained at no other locality.

Ophiactis pectorale, n.sp. Obtained at no other locality.

Amphiura glabra, n.sp. Obtained at no other locality.

Ophiacantha levispina, n.sp. Obtained at no other locality.

,, near *pentacrinus*, Lütken (?). Obtained at no other locality by the Challenger.

Ophiomitra plicata, n.sp. Obtained also at Stations 170 and 205.

Ophiocreas œdipus, n.sp. Obtained also at Stations 343 and 344, 425 and 420 fathoms.

Echinoidea (Agassiz, Zool. pt. 9).

Porocidaris elegans, n.sp. Obtained also at Station 164B.

Gephyrea (Selenka, Zool. pt. 36).

Phascolosoma prioki, Sluiter. One specimen; obtained at no other locality by the Challenger. Recorded from Batavia.

Annelida (M'Intosh, Zool. pt. 34).

Iphionella cimex (Quatrefages). One specimen; obtained at no other locality by the Challenger.

Genetyllis (?) *oculata*, n.sp. One specimen; obtained at no other locality.

Myzostomida (Graff, Zool. pt. 27).

Myzostoma calycotyle, n.sp. (On *Pentacrinus alternicirrus*).

,, *wyville-thomsoni*, n.sp. (On *Metacrinus costatus*).

,, *asymmetricum*, n.sp. (On *Pentacrinus alternicirrus*).

,, *pentacrini*, n.sp. (On *Pentacrinus alternicirrus*).

,, *deformator*, n.sp. (On *Pentacrinus alternicirrus*).

,, *tenuispinum*, n.sp. (On *Antedon angusticalyx*).

Cirripedia (Hoek, Zool. pt. 25).

Scalpellum album, n.sp. Two specimens ; obtained at no other locality.

Verruca nitida, n.sp. One specimen ; obtained at no other locality.

Amphipoda (Stebbing, Zool. pt. 67).

Cystisoma spinosum (Fabricius). One specimen ; for distribution see Station V.

Isopoda (Beddard, Zool. pt. 48).

Trichopleon ramosum, n.g., n.sp. One specimen ; obtained at no other locality. Only species of the genus.

Arcturus cornutus, n.sp. One specimen ; obtained at no other locality.

One specimen, genus and species undetermined.

Schizopoda (Sars, Zool. pt. 37).

Gnathophausia calcarata, n.g., n.sp. One specimen ; obtained also at Station 191.

Macrura (Spence Bate, Zool. pt. 52).

Pentacheles lævis, n.g., n.sp. One specimen ; obtained also at Station 300, 1375 fathoms.

Benthesicymus altus, n.g., n.sp. Three specimens ; obtained also at Stations 133, 170, 171, 174, 184, 205, 232, and 235.

Heterocarpus alphonsi, n.sp. Fourteen specimens ; obtained also at Station 232, 345 fathoms. Recorded subsequently from Indian Ocean ("Investigator").

Acanthephyra acutifrons, n.sp. One specimen; obtained also at Stations 191 and 213.

,, *brachytelsonis*, n.sp. Three specimens ; obtained also at Stations 170, 171, 194, 232, 236, and 318.

Nematocarcinus undulatipes, n.sp. Three specimens ; obtained also at Stations 171, 194, and 200.

,, *tenuirostris*, n.sp. Five specimens ; obtained also at Station 174.

Anomura (Henderson, Zool. pt. 69).

Parapagurus affinis, n.sp. One specimen (in *Pleurotoma* shell) ; obtained at no other locality.

Pagurodes limatulus, n.g., n.sp. One specimen (in *Pleurotoma* shell) ; obtained at no other locality.

Uroptychus spinimarginatus, n.sp. Two specimens ; obtained also at Station 170.

Brachyura (Miers, Zool. pt. 49).

Cyrtomaia suhmii, n.g., n.sp. One specimen ; obtained at no other locality. The only other species of the genus (*Cyrtomaia murrayi*) was taken at Station 192.

Station 214. Gasteropoda (Watson, Zool. pt. 42).

Trochus (*Margarita*) *streptophorus*, n.sp. Obtained at no other locality.
Pleurotoma (*Surcula*) *dissimilis*, n.sp. One specimen; obtained at no other locality.
Scaphander niveus, n.sp. One specimen; obtained at no other locality.

Cephalopoda (Hoyle, Zool. pt. 44).

Cirroteuthis meangensis, n.sp. One specimen; obtained also at Station 171.

Polyzoa (Busk, Zool. pt. 30).

Bifaxaria lævis, n.g., n.sp. Obtained at no other locality.

Fishes (Günther, Zool. pt. 57).

Macrurus villosus, n.sp. One specimen; obtained also at Station 232, 345 fathoms.
Bathygadus multifilis, n.g., n.sp. One specimen; obtained at no other locality.
Sternoptyx diaphana (Herm.). Six specimens; for distribution see Station 101.
Nannobrachium nigrum, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.
Omosudis lowii, n.g., n.sp. One specimen; obtained at no other locality by the Challenger. Recorded from Madeira. Only species of the genus.
Malacosteus indicus, n.sp. One specimen; obtained at no other locality. Recorded subsequently from Indian Ocean ("Investigator").
Synaphobranchus pinnatus (Gronov.). Two specimens; for distribution see Station 125.

In addition to the foregoing, the following are recorded in the Station-book:—Actinian on shell inhabited by *Pagurus*, several small urchins, *Peltogaster* in Ophiurid, *Lernæonema*, valve of *Hinnites*, and seven much injured specimens of *Coccia ovata* (?).

Excluding Protozoa, nearly 200 specimens of invertebrates and fishes were obtained at this Station, belonging to about 73 species, of which 59 are new to science, including representatives of 15 new genera; 37 of the new species and 3 new genera were not obtained elsewhere.

Willemoes-Suhm writes: "The trawl brought up many Pentacrini, having as parasites (1) Lepadid and (2) Balanid external on the branches, and (3) *Myzostoma* in cysts of the arms, sometimes three together. Very likely the young *Myzostoma* bores itself in (how ?) and grows there, damaging the arms of the *Pentacrinus* so much that they break most easily at the place chosen by the parasite. These parasitic forms probably never lead a free life, but discharge their eggs inside the cyst, from which they escape

by a small opening present in each of them. Near the mouth of an Ophiurid I found a large tumour containing a *Bopyrus* or *Peltogaster* inflated with eggs. One of the smaller black fishes had a *Lernæonema* with egg-sacs on the middle of the body. There were besides: a curious Aphroditacean very much like a Chiton in appearance [= *Iphionella cimex*], a Nephthydean Annelid, *Sipunculus* [= *Phascolosoma prioki*], a large *Arcturus*, another small Isopod, a fine large specimen of *Cystisoma neptuni* [= *Cystisoma spinosum*], several Caridids and Peneids, a young male of *Gnathophausia gigas* [= *Gnathophausia calcarata*], 7 mm. in length, a small specimen of *Willemoesia euthrix* [= *Pentacheles lævis*], which had lost the long chelæ, and a specimen of *Cirroteuthis*, which genus, wonderfully illustrated by Prosch and Reinhardt in the Danish Transactions under the name of *Sciadephorus*, we have taken before in deep water several times, especially in the Antarctic." Station 214.

In *Malacosteus* there was a remarkable connecting band between the tongue and the symphysis of the mandible; no barbel was present. The larger club-shaped phosphorescent spot immediately under the eye was of a dull red colour; the small round spot posterior to this was of a beautiful light yellowish green colour. A Lernæan, mentioned above by Suhm, was attached to this *Malacosteus*.

Foraminifera (Brady, Zool. pt. 22).—The following species of Foraminifera were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.); the pelagic species, which make up about 73 per cent. of the carbonate of lime present in the deposit, are marked thus ×:— Organisms from the Deposit.

Biloculina depressa, d'Orbigny.
Cassidulina crassa, d'Orbigny.
„ *lævigata*, d'Orbigny.
Uvigerina angulosa, Williamson.
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *dubia*, Egger.
× „ *inflata*, d'Orbigny.
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Pullenia obliquiloculata*, Parker and Jones.
× *Sphæroidina dehiscens*, Parker and Jones.
× *Candeina nitida*, d'Orbigny.
Truncatulina lobatula, Walker and Jacob.
× *Pulvinulina menardii* (d'Orbigny).
× „ *patagonica* (d'Orbigny).
× „ *tumida*, Brady.
Rotalia soldanii, d'Orbigny.
Nonionina umbilicatula (Montagu).

Surface Organisms.—The following species are recorded from the surface at this Station:— Organisms from Surface-Nets.

Radiolaria (Haeckel, Zool. pt. 40).

Psilomelissa galeata, Haeckel.
Sethoconus trochus, Haeckel.
Dictyomitra macilenta, Haeckel.

Fishes (Günther, Zool. pt. 78).

Psenes cyanophrys, C.V.

Two hauls of the tow-net were taken at the surface, a few small *Globigerinæ* and a few other things being procured, while a net sent down to 100 fathoms was lost.

Station 215. **Station 215** (Sounding 352), Samboangan to New Guinea (see Chart 31 and Diagrams 14 and 15).

February 12, 1875 ; lat. 4° 19′ N., long. 130° 15′ E.
Temperature of air at noon, 80°·3 ; mean for the day, 79°·1.
Temperature of water :—

	°		°
Surface,	81·8	400 fathoms,	43·2
10 fathoms,	77·7	500 „	41·0
20 „	76·1	600 „	39·8
30 „	75·4	700 „	38·5
40 „	75·1	800 „	37·5
50 „	74·5	900 „	37·0
60 „	73·4	1100 „	36·0
70 „	72·0	1300 „	35·4
80 „	70·6	1400 „	35·4
90 „	69·3	1500 „	35·4
100 „	68·0	1600 „	35·4
200 „	54·0	Bottom,	35·4

Density at 60° F. :—

Surface,	1·02597	200 fathoms,	1·02579
50 fathoms,	1·02593	400 „	1·02560
100 „	1·02627	Bottom,	1·02572
150 „	1·02584		

Depth, 2550 fathoms ; deposit, Red Clay, containing no carbonate of lime, but large numbers of Radiolaria (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 7.30 A.M. got up steam. At 9 A.M. shortened and furled sails and proceeded under steam. At 9.30 A.M. sounded in 2550 fathoms. At 11.30 A.M. put over trawl. Obtained serial temperatures down to 1600 fathoms. The carbonic acid was determined in the bottom water, and amounted to 52·4 milligrammes per litre. At 4 P.M. commenced heaving in trawl, which came up at 7.15 P.M. containing one small shrimp and a few pumice-stones ; in the cavities of the pumice Mr. Murray recognised some arenaceous Foraminifera. The small oval arenaceous bodies, believed to be the excreta of Echinoderms, which were almost constantly present in the Blue Muds from the partially-enclosed seas stretching between Asia and Australia, in fact in all the deposits since leaving Cape York, were not observed in the deposit from this Station. No cloth was placed in the bottom of the cod of the trawl-net on this occasion, and Mr. Murray attributed the unsuccessful haul largely to this fact. At 7.30 P.M. made all plain sail. Boatswain birds and boobies were seen.

Distance at noon from Lord North Island, 94 miles; from Warren Hastings Island, 133 miles; and from Greenwich Island, 1485 miles. Made good 75 miles. No current. STATION 215.

The following species is recorded from the trawl at this Station :—

MACRURA (Spence Bate, Zool. pt. 52).

Hymenodora glauca, n.sp. One specimen; obtained also at Station 159.

Surface Organisms.—The following species are recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Pleuraspis horrida, Haeckel.
Coscinaspis ceriopora, Haeckel.
Acontaspis hastata, Haeckel (?).
Psilomelissa galeata, Haeckel.
Sethoconus trochus, Haeckel.
Dictyomitra macilenta, Haeckel.

In addition, the following are recorded in the note-books (February 12 to 15):— Oscillatoriaceæ, *Peridinium*, *Pyrocystis noctiluca* and *Pyrocystis fusiformis*, *Coscinodiscus rex* and other Diatoms, *Globigerina* (various species) and *Pullenia* in great abundance, *Orbulina*, *Pulvinulina*, Acanthometræ in large numbers, *Acineta* on the tail of a Copepod, *Physalia* (apparently different from the Atlantic species), *Diphyes*, *Velella*, and other Siphonophoræ, Semper's golden-haired Cœlenterate larva, *Sagitta*, *Alciopa*, *Terebella* larva with otoliths, Sipunculid larvæ, Planarians, Copepods, *Rhabdosoma*, *Phronima*, *Phronimella*, Zoëæ of *Euphausia*, *Amphion*, *Firoloida* with egg-strings, *Cardiopoda*, *Atlanta* and larvæ, various species of Pteropods, small Cephalopod, *Appendicularia*, *Salpa* (two species—single and in chains), young *Amphioxus* and other small fishes. Several schools of dolphins were seen, and some fishes jumping out of the water.

Mr. Murray observed the protoplasm in *Globigerina rubra* moving up and down the spines; this was rendered visible by the small refrigerent particles and a thickening of the sarcode. The large oval-shaped symbiotic yellow cells (similar to those of the Radiolaria) moved about in the fluid-sarcode, and came outside the shell, forming a thick layer on the surface of the shell; some of these zooxanthellæ proceeded some distance up the spines, and sometimes they formed into clumps of six to a dozen, and had a curious rotating and advancing motion, apparently independent of the fluid. Delicate pseudopodia were also observed in *Pulvinulina*.

Moseley writes: "The tow-net yielded a very rich harvest, being full of oceanic forms and their larvæ, without any shore larvæ. Pteropods were abundant, also *Atlanta* with its larvæ, having four long ciliated processes of the velum, as figured in Bronn's

Station 215. Thier-Reichs, and *Appendicularia* was present in swarms. There was a fine perfectly transparent male *Rhabdosoma*, apparently a different species from the Atlantic one; it was extremely active, working the abdominal swimmerets with great rapidity and darting forwards."

Station 216. **Station 216** (Sounding 353), Samboangan to New Guinea (see Chart 31 and Diagram 15).

February 16, 1875; lat. 2° 46′ N., long. 133° 58′ E.
Temperature of air at noon, 83°·3; mean for the day, 79°·5.
Temperature of water :—

Surface,	82°·8	600 fathoms,	39°·9
100 fathoms,	71·9	700 „	38·9
200 „	49·2	800 „	38·0
300 „	44·3	900 „	37·4
400 „	42·3	1000 „	37·0
500 „	41·0	Bottom,	35·4

Density at 60° F. at bottom, 1·02585.
Depth, 1675 fathoms; deposit, Globigerina Ooze, containing 49·03 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. stopped engines. At 5.30 A.M. sounded in 1675 fathoms to the S.W. of the supposed position of Carteret reef. Obtained serial temperatures down to 1000 fathoms. At 8.20 A.M. completed observations and proceeded N.E. towards the supposed position of Carteret reef. At 11.20 A.M. altered course towards apparently broken water, which proved to be a school of whales. Altered course again and proceeded.

Station 216A. **Station 216A.**

February 16, 1875; lat. 2° 56′ N., long. 134° 11′ E.
Temperature of water :—

Surface,	82°·8	125 fathoms,	65·0
25 fathoms,	83·2	150 „	57·8
50 „	81·5	175 „	51·5
75 „	78·8	200 „	48·7
100 „	71·8	Bottom,	35·4

Density at 60° F. at surface, 1·02570; bottom, 1·02567.

Depth, 2000 fathoms; deposit, Globigerina Ooze, containing 34·67 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.). STATION 216A.

At noon stopped and put trawl over. At 12.30 P.M. sounded in 2000 fathoms on the supposed position of Carteret reef, but no appearance of reef within range of vision. At 2 P.M. obtained serial temperatures at intervals of 25 fathoms down to 200 fathoms. At 4 P.M. commenced heaving in trawl, which came up at 6.20 P.M. with several specimens and pumice-stones. Proceeded under steam towards Greenwich Island. Boatswain birds, boobies, and noddy terns were seen; some of the noddy terns alighted on the ship and one was caught.

Distance at noon from Greenwich Island, 1240 miles. Made good 44 miles. Amount of current 7 miles, direction S. 45° E.

The following species are recorded in the Zoological Reports from the trawl at this Station :— ANIMALS FROM TRAWL.

DEEP-SEA KERATOSA (Haeckel, Zool. pt. 82).

Ammosolenia rhizammina, n.g., n.sp. Obtained at no other locality. Only species of the genus.

Cerelasma lamellosa, n.g., n.sp. Two specimens; obtained at no other locality.

MONAXONIDA (Ridley and Dendy, Zool. pt. 59).

Chondrocladia crinita, n.sp. One specimen; obtained at no other locality.

ASTEROIDEA (Sladen, Zool. pt. 51).

Freyella echinata, n.sp. Obtained also at Stations 198 and 205.

OPHIUROIDEA (Lyman, Zool. pt. 14).

Ophioglypha ornata, n.sp. Obtained at no other locality.

HOLOTHURIOIDEA (Théel, Zool. pts. 13 and 39).

Deima fastosum, n.g., n.sp. Two specimens; obtained at no other locality.

Pseudostichopus villosus, n.g., n.sp. One specimen; for distribution see Station 61.

CIRRIPEDIA (Hoek, Zool. pt. 25).

Scalpellum marginatum, n.sp. One specimen; obtained at no other locality.

„ *ovatum*, n.sp. One specimen; obtained at no other locality.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Arca (*Barbatia*) *corpulenta*, n.sp. Obtained also at Stations 184, 194, 198, 271, and 300.

Station 216A.

Cephalopoda (Hoyle, Zool. pt. 44).

Spirula peronii, Lamarck. Dead shell (probably from the surface); for distribution see Station 194.

Fishes (Günther, Zool. pt. 57).

Chauliodus sloanii, Bl. Schn. One specimen; for distribution see Station 60.

In addition to the foregoing, the Station-book records:—Another Sponge (?), Antipathid axis, Polyzoon, and two specimens of *Discina*.

Excluding Protozoa, over 20 specimens of invertebrates and fishes were obtained at this Station, belonging to about 16 species, of which 10 are new to science, including representatives of 4 new genera; 7 of the new species and 1 new genus were not obtained elsewhere.

There were many worm-tubes among the pumice-stones, and the trawl-net was covered by the branching Rhizopod *Rhizammina algæformis*. Many of the pumice-stones were coated with manganese, and to them were attached specimens of *Stephanoscyphus*.

Organisms from Surface-Nets.

Surface Organisms.—In addition to the *Spirula* shell mentioned above, the following species are recorded from the surface at this place:—

Amphipoda (Stebbing, Zool. pt. 67).

Synopia schéeleana, Bovallius.

Pteropoda (Pelseneer, Zool. pt. 65).

Limacina inflata (d'Orbigny).
„ *lesueuri* (d'Orbigny).
„ *trochiformis* (d'Orbigny).
Clio (*Creseis*) *virgula* (Rang).
„ („) *acicula* (Rang).
„ („) *balantium* (Rang).
Cuvierina columnella (Rang).
Cavolinia quadridentata (Lesueur).
„ *globulosa* (Rang).
Hyalæa depressa, d'Orbigny (= young of *Cavolinia inflexa*?).
Gleba sp. (?). (Larval shells).
Agadina stimpsoni, Adams. } (= Larval
„ n.sp. } Gasteropods).

In addition, the following are recorded in the note-books (February 16 to 21):—*Noctiluca*, *Peridinium*, *Pyrocystis*, Diatoms (a bunch of Diatoms was found on the tail of a Copepod), *Globigerina*, *Collosphæra* and other Radiolaria, *Physalia*, small Ctenophor, *Sagitta*, Sipunculid larvæ, Aphroditacean larvæ, Dendrocœlous Planarian larvæ (*Eurylepta*?), Copepods, *Phronima*, *Phronimella*, *Oxycephalus*, *Squilla* larvæ, *Euphausia*, *Amphion*, *Sergestes*, *Lucifer*, Zoëæ, Nauplii, *Atlanta* and other Heteropods, *Pneumonoderma* larvæ, *Doliolum* (the blood-corpuscles of which were observed to have amœboid movements), *Salpæ* (the stomachs of which contained Rhabdospheres, Coccospheres, Diatoms, and small *Globigerinæ*).

On the afternoon of the 21st Mr. Murray went away in the dingey and visited several patches of floating driftwood, of which much had been observed on the surface during the past two days. Under the drift three or four varieties of small fishes and small slate-coloured crabs were captured by means of a scoop-net. The pieces of driftwood were covered with small specimens of *Lepas;* the arm of a cuttlefish (*Histioteuthis*) was picked up, and a sea-snake (*Pelamys bicolor*), three feet in length, was captured alive and brought on board. Several kinds of sea-weeds and fruits were also collected among the driftwood.[1] In some places there were large patches of *Collosphæra* and other Radiolaria, and a number of birds (*Phalaropus hyperboreus*) appeared to be feeding on them; wherever these patches of *Collosphæra* occurred the sea had an oily appearance. A *Balistes* was noticed among the fishes, and sharks were evidently feeding on the small fishes. Boobies alighted and sat upon the driftwood. The presence of *Peridinium*, *Noctiluca*, Diatoms, Annelid and other larvæ, as well as the driftwood, indicated fresh water, apparently derived from some large river in New Guinea. A school of porpoises came near the ship and lay lazily at the surface. STATION 216A.

Station 217 (Sounding 355), Samboangan to New Guinea (see Chart 31 and Diagram 15). STATION 217.

February 22, 1875; lat. 0° 39′ S., long. 138° 55′ E.

Temperature of air at noon, 82°·3; mean for the day, 81°·0.

Temperature of water:—

	°		°
Surface, ...	83·0	180 fathoms, . . .	51·9
10 fathoms, . . .	83·0	190 „ . . .	50·8
20 „ . . .	83·0	200 „ . . .	49·7
30 „ . . .	83·0	300 „ . . .	45·1
40 „ . . .	82·9	400 „ . . .	42·5
50 „ . . .	82·5	500 „ . . .	40·7
60 „ . . .	81·4	600 „ . . .	39·2
70 „ . . .	80·0	700 „ . . .	38·1
80 „ . . .	78·3	800 „ . . .	37·3
90 „ . . .	76·4	900 „ . . .	36·7
100 „ . . .	74·0	1000 „ . . .	36·2
110 „ . . .	70·5	1100 „ . . .	35·7
120 „ . . .	66·5	1200 „ . . .	35·3
130 „ . . .	62·3	1300 „ . . .	35·2
140 „ . . .	58·6	1400 „ . . .	35·2
150 „ . . .	56·0	1500 „ . . .	35·2
160 „ . . .	54·2	Bottom, . . .	35·2
170 „ . . .	53·0		

[1] For description of the fruits collected in this locality see *Bot. Chall. Exp.*, pt. iii.

Station 217.

Density at 60° F. :—

Surface,	1·02518	100 fathoms,	1·02644
10 fathoms,	1·02561	200 ,,	1·02637
15 ,,	1·02562	300 ,,	1·02565
20 ,,	1·02565	400 ,,	1·02564
40 ,,	1·02578	Bottom,	1·02595
50 ,,	1·02618		

Depth, 2000 fathoms; deposit, Blue Mud, containing 12·75 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 6 A.M. stopped and sounded in 2000 fathoms. Obtained serial temperatures down to 1500 fathoms. At 11 A.M. completed temperatures and proceeded S.E. During the forenoon passed large quantities of driftwood; early in the morning the patent log fouled the driftwood and the log-line parted. The sea seemed to be teeming with fish; observed whales, dolphins, &c. Lowered boat for surface collecting; Moseley returned with numerous seeds of plants gathered on the edge of the tidal current, and two specimens of *Phalaropus hyperboreus*.

Distance at noon from Caillé Point, Humboldt Bay, New Guinea, 164 miles. Made good 53 miles. Amount of current 15 miles, direction S. 42° W.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Buccinosphæra tubaria, Haeckel.
Psilomelissa galeata, Haeckel.
Sethoconus trochus, Haeckel.
Dictyomitra macilenta, Haeckel.

Cirripedia (Hoek, Zool. pt. 25).

Lepas anserifera, Linné.

Brachyura (Miers, Zool. pt. 49).—From driftwood.

Varuna litterata (Fabricius).
Plagusia immaculata, Lamarck.

Cephalopoda (Hoyle, Zool. pt. 44).

Spirula peronii, Lamarck. Dead shell.

Fishes (Günther, Zool. pt. 78).—From driftwood.

Pimelepterus waigiensis, Quoy and Gaimard.
Seriolichthys bipinnulatus, Quoy and Gaimard.
Psenes cyanophrys, C.V.
Balistes sp. (?).

In addition, the following are recorded in the note-books:—*Noctiluca*, a few *Globigerinæ*, Ctenophoræ (*Eucharis*), *Sagitta*, young *Tomopteris*, Sabellid larvæ, Dendrocœlous Planarians, with digitiform processes, and larvæ, *Hyperia*, *Oxycephalus*,

Idothea, *Amphion*, *Lucifer*, *Grapsus*, small shells, larvæ of *Pneumonoderma*, *Appendicularia*. Many fishes, sharks, and whales were seen among the driftwood. STATION 217.

Moseley writes: "We passed through lines of driftwood, disposed in curves parallel with the shore of New Guinea. In the morning the screw had to be stopped several times for fear of fouling. The logs of wood were comparatively fresh, being covered only with young Balanids and a few Hydrozoa, but only scantily. Among the wood were many whole uprooted trees, some of which were curved in the stem, as are trees which overhang streams. I saw one tree two feet in diameter of trunk. The majority of the pieces were of small wood, branches, &c. The bark was often floating separately. The stems of the leaves of some pinnate palm were abundant, and also stems of a large *Arundo*, apparently very like the one so abundant on the shores of the Wai Levu in Fiji. The broken-off stem of a reed, which showed fine branches at the upper end, was 14 feet in length and $1\frac{1}{2}$ inches in diameter (2 inches at the knots). Various fruits of trees, &c., were abundant, usually floating confined in the midst of the small aggregations into which the floating timber was almost everywhere gathered. Amongst these seeds were those of two species of *Pandanus* (the usual littoral species as in Arrou, I think), seeds of *Heritiera littoralis* and fruits, a *Barringtonia*, with the fruit also of *Ipomœa pes capræ*, but besides the fruits of these littoral plants were seeds of about forty species of plants most evidently from a higher level more inland. Amongst these were several myrtaceous and leguminous fruits (entada), a *Calamus* fruit, and seeds of a conifer apparently, also a fruit apparently of a *Fagus*, and there were lichens on the small pieces of twigs, &c. Very small seeds were as abundant as large ones, in fact more abundant, but it was only discovered too late, when the recall for my boat was hoisted, that the surface scum was full of these small seeds, which were to be obtained in abundance by skimming it with a net. The entire absence of leaves, except those of the palm (for the pinnæ were present on some of the palm leaves) was striking; the leaves evidently drop first to the bottom as vegetable drift floats from a shore, hence that part of a marine geological bed found to abound in leaves with few fruits was probably formed near land, or at least a bed full of fruits and wood without leaves was probably formed at a distance from land. Much of the wood was floating suspended vertically in the water, and most curiously logs and short branch pieces thus floating were often in separate groups apart from the horizontally floating timber. I did not examine these groups with sufficient care. Perhaps the water penetrates and waterlogs wood more easily in one direction with regard to growth than in the other; hence one end becomes waterlogged sooner. The fruits and wood were covered with the eggs of some Mollusc and with a Hydroid, and the interstices were filled with Radiolarians, washed into them and gathered in masses, as the Diatoms in the south were gathered in the honeycombed ice. A small Dendrocœlous Planarian, with central mouth, diffuse ovaries, a superior penis, and single generative aperture, was in swarms upon everything, not only upon the dead matter but all over the living

Station 217. crabs. The crabs, a small *Grapsus*-like form and another larger one, inhabit the logs as does *Nautilograpsus* those in the Atlantic. These various animals appear to frequent the logs because of the concentration about them of the surface animals. Enormous quantities of small fish were about the wood, and troops of dolphins (*Coryphæna*), and sharks (*Carcharias*) two to four feet in length, were seen feeding in the midst of the driftwood masses, splashing the water and showing above the surface as they caught their prey. I found a large Ctenophor (*Eucharis*) and *Physalia*, and very small flying fish were common, as among the gulf-weed. The wood was bored by a *Pholas* and by an *Aphrodita*."

At New Guinea. The Challenger remained at Humboldt Bay, New Guinea, on February 23 and 24, 1875 (for description of Humboldt Bay see *Narr. Chall. Exp.*, vol. i. pp. 681–689). The deposit in 37 fathoms was a Blue Mud, containing 28·91 per cent. of carbonate of lime, in which the following species of Ostracoda were observed:—

Organisms from the Deposit. Ostracoda (Brady, Zool. pt. 3).

Phlyctenophora zealandica, n.g., n.sp. Obtained also at Port Jackson and Wellington Harbour, N.Z.
Pontocypris attenuata, Brady. Obtained also at Hong Kong.
Macrocypris orientalis, Brady (?). Obtained also at Station 187.
Bairdia amygdaloides, Brady. For distribution see Station 162.
Cythere papuensis, n.sp. Obtained at no other locality.
,, *dictyon*, n.sp. Widely distributed (see Station 24).
,, *scutigera*, Brady. Obtained also at Stations 167, 300, and Amboina.
Cytherella semitalis, Brady. For distribution see Station 187.

Organisms from Surface-Nets. Surface Organisms.—The following species are recorded from the surface in the neighbourhood of New Guinea:—

Copepoda (Brady, Zool. pt. 23).

Leuckartia flavicornis, Claus (?).
Undina vulgaris, Dana.
,, *darwinii*, Lubbock.
Scolecithrix danæ (Lubbock).
Euchæta prestandreæ, Philippi.
Pontella plumata, Dana.
Setella gracilis, Dana.
Corycæus sp. (?).
Copilia mirabilis, Dana.
Oncæa obtusa, Dana.
Saphirina ovalis, Dana.
,, *opalina*, Dana.

Amphipoda (Stebbing, Zool. pt. 67).

Phronimella elongata, Claus.

Schizopoda (Sars, Zool. pt. 37).

Euphausia pellucida, Dana.
Thysanopoda tricuspidata, M.-Edwards, (juv.).

Nematoscelis rostrata, n.g., n.sp.
Siriella gracilis, Dana.

Macrura (Spence Bate, Zool. pt. 52).

Sergestes corniculum, Krøyer.
„ *læviventralis*, n.sp.
Sciacaris telsonis, n.g., n.sp.
Amphion (Zoëæ).

Heteropoda (Smith, Zool. pt. 72). New Guinea.
Carinaria cristata (Linné).

Tunicata (Herdman, Zool. pt. 76).
Salpa runcinata-fusiformis, Chamisso—Cuvier.

Fishes (Günther, Zool. pt. 78).
Scopelus caninianus (C.V.).

In addition, the following are recorded in the note-books :—*Peridinium* (three species), *Pyrocystis*, Oscillatoriaceæ, Foraminifera (shore forms), Acanthometræ, Medusæ, *Cydippe*, Echinoderm larvæ (Pluteus, Brachiolaria), *Sagitta*, Annelid larvæ, Dendrocœlous Planarian larvæ, small Isopods (young of *Praniza*), larvæ of *Cymbulia*, *Styliola*, *Appendicularia*, and small fishes.

February 25 to 28, 1875.

Surface Organisms.—The following are recorded in the note-books from the surface on these dates between New Guinea and Station 218 :—Oscillatoriaceæ, *Pyrocystis, fusiformis* and *Pyrocystis noctiluca*, *Peridinium* (*tripos* and two other species), *Rhizosolenia*, *Ethmodiscus*, and other Diatoms, *Globigerina* and *Orbulina* (in both of which protoplasmic movements were under observation for a considerable time), Acanthometræ, Polycystinæ, Thalassicollidæ, *Tintinnus* and other ciliate Infusorians, Semper's Cœlenterate larva, Medusæ, *Diphyes* and other Siphonophoræ, *Cydippe*, Echinoderm larvæ (Bipinnaria, Pluteus, and Holothurid larvæ), *Sagitta*, Planarian larvæ (*Eurylepta* ?), Annelids and tubicolous larvæ. Tornaria, Sipunculid larvæ, *Caligus*, *Pontella*, *Saphirina*, *Corycæus*, *Copilia*, *Setella*, *Calanus*, *Hyperia*, *Phronimella*, *Euphausia*, *Sergestes* larvæ (*Elaphocaris*), *Amphion*, *Lucifer*, Zoëæ and Megalopæ of crabs, *Halobates*, *Firoloida*, *Atlanta*, *Macgillivraya*, *Cavolinia*, *Styliola*, *Limacina*, small Cephalopod (*Gonatus* ?), *Appendicularia*, *Doliolum*, small fishes, young *Amphioxus*, and a much mutilated Scopelid between three and four inches long. A little phosphorescence was observed at night, and logs of wood with crabs, as well as *Coryphæna*, were observed, and a small *Chætodon* was seen swimming about the screw.

Station 218 (Sounding 356), New Guinea to Admiralty Islands (see Chart 31 and Diagram 15). Station 218.

March 1, 1875 ; lat. 2° 33′ S., long. 144° 4′ E.
Temperature of air at noon, 83°·8 ; mean for the day, 81°·4.

ANTIPATHARIA (Brook, Zool. pt. 80). STATION 218.

Schizopathes affinis, n.g., n.sp. One specimen; obtained also at Station 195.

Bathypathes patula, n.g., n.sp., var. *plenispina*, nov. One specimen; the species obtained also at Stations 195, 244, and 246.

CORALS (Moseley, Zool. pt. 7).

Flabellum conuis, n.sp. One specimen; obtained at no other locality.

Bathyactis symmetrica (Pourtalès). Several specimens; for distribution see Station 24.

CRINOIDEA (Carpenter, Zool. pt. 60).

Antedon alternata, n.sp. One specimen; obtained also at Stations 169, 170, and 236.

ASTEROIDEA (Sladen, Zool. pt. 51).

Zoroaster tenuis, n.sp. Obtained at no other locality.

Hymenaster pullatus, n.sp. Obtained at no other locality.

Benthaster penicillatus, n.g., n.sp. Obtained at no other locality.

OPHIUROIDEA (Lyman, Zool. pt. 14).

Ophioglypha æqualis, n.sp. Obtained at no other locality.

Ophiomastus tegulitius, n.g., n.sp. Obtained also at Stations 164, 165, and 166.

Ophiotrochus panniculus, n.g., n.sp. Several specimens; obtained at no other locality. Only species of the genus.

Ophiacantha cosmica, n.sp. For distribution see Station 122.

ECHINOIDEA (Agassiz, Zool. pt. 9).

Podocidaris prionigera, n.sp. Obtained also at Station 205.

Prionechinus sagittiger, n.g., n.sp. Obtained also at Stations 164 and 207. Only species of the genus.

OSTRACODA (Brady, Zool. pt. 3).

Bairdia exaltata, n.sp. Obtained at no other locality.

Cythere dictyon, n.sp. Widely distributed (see Station 24).

„ *dasyderma*, n.sp. Widely distributed (see Station 5).

CIRRIPEDIA (Hoek, Zool. pt. 25).

Scalpellum distinctum, n.sp. One specimen; obtained at no other locality.

ISOPODA (Beddard, Zool. pt. 48).

Eurycope pellucida, n.sp. One specimen; obtained at no other locality.

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Cymodocea abyssorum, n.sp. Two specimens; obtained at no other locality.

Anuropus branchiatus, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Macrura (Spence Bate, Zool. pt. 52).

Paraxius altus, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Polycheles helleri, n.sp. One specimen; obtained also at Station 170.

Pentacheles obscura, n.g., n.sp. One specimen; obtained at no other locality.

Glyphocrangon granulosis, n.sp. Two specimens; obtained at no other locality.

Nematocarcinus tenuipes, n.sp. One specimen; obtained also at Stations 232 and 235, 345 and 565 fathoms. Recorded subsequently from Indian Ocean ("Investigator").

,, *intermedius*, n.sp. Two specimens; obtained at no other locality.

Anomura (Henderson, Zool. pt. 69).

Parapagurus abyssorum, M.-Edwards. One specimen; for distribution see Station 56.

Munidopsis brevimana, n.sp. Many specimens; obtained also at Station 191.

Elasmonotus latifrons, n.sp. One specimen; obtained at no other locality.

Lamellibranchiata (Smith, Zool. pt. 35).

Amussium watsoni, n.sp. Several specimens; obtained at no other locality.

Scaphopoda and Gasteropoda (Watson, Zool. pt. 42).

Dentalium acutissimum, n.sp. Obtained also at Station 246, 2050 fathoms.

Aporrhais n.sp. (?).

Tunicata (Herdman, Zool. pt. 76).

Octacnemus bythius, Moseley, n.g., n.sp. One specimen; obtained also at Station 299, 2160 fathoms. Only species of the genus.

Fishes (Günther, Zool. pt. 57).

Acanthonus armatus, n.g., n.sp. One specimen; obtained also at Station 205. Only species of the genus.

Sternoptyx diaphana (Herm.). One specimen; widely distributed (see Station 101).

Gonostoma microdon, n.sp. One specimen; widely distributed (see Station 23).

Synaphobranchus brevidorsalis, n.sp. One specimen; obtained also at Station 232, 345 fathoms.

In addition to the foregoing, the following are recorded in the Station-book :—*Caudina* (*Molpadia*), two specimens of *Holothuria*, *Onuphis*, blind Zoëa, two Polyzoa, five different fishes (four only noted above). STATION 218.

Excluding Protozoa, over 100 specimens of invertebrates and fishes were obtained at this Station, belonging to about 50 species, of which 36 are new to science, including representatives of 11 new genera ; 17 of the new species and 3 new genera were not obtained elsewhere.

The following species of Heteropoda and Foraminifera were observed in the deposit from this Station, in which were many oval arenaceous bodies, supposed to be the dung of Holothurians, like those common in the deposits in the Sulu and other enclosed seas (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :— ORGANISMS FROM THE DEPOSIT.

HETEROPODA (Smith, Zool. pt. 72).

Carinaria cristata (Linné).

FORAMINIFERA (Brady, Zool. pt. 22).—The pelagic species, which make up about 58 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina comata, Brady.
„ *depressa*, d'Orbigny.
„ „ var. *serrata*, Brady.
„ *irregularis*, d'Orbigny.
„ *sphæra*, d'Orbigny.
Spiroloculina limbata, d'Orbigny.
„ *tenuis* (Czjzek).
Miliolina oblonga (Montagu).
„ *secans* (d'Orbigny).
„ *seminulum* (Linné).
„ *venusta* (Karrer).
Planispirina celata (Costa).
Hyperammina vagans, Brady.
Rhabdammina abyssorum, Sars.
„ *discreta*, Brady.
Reophax bacillaris, Brady.
„ *difflugiformis*, Brady.
„ *distans*, Brady.
„ *nodulosa*, Brady.
„ *pilulifera*, Brady.
Haplophragmium agglutinans (d'Orbigny).
„ *foliaceum*, Brady.
„ *globigeriniforme* (Parker and Jones).
„ *latidorsatum* (Bornemann).
„ *tenuimargo*, Brady.
Hormosina globulifera, Brady.
„ *ovicula*, Brady.
Ammodiscus charoides (Jones and Parker).
„ *gordialis* (Jones and Parker).
„ *incertus* (d'Orbigny).
Trochammina pauciloculata, Brady.
Webbina clavata, Jones and Parker.
Cyclammina cancellata, Brady.
Textularia sagittula, Defrance (?).
Verneuilina pygmæa (Egger).
Gaudryina pupoides, d'Orbigny.
„ *siphonella*, Reuss.
Clavulina communis, d'Orbigny.
Bulimina aculeata, d'Orbigny.
„ *contraria* (Reuss).
„ *inflata*, Seguenza.
„ *pyrula*, d'Orbigny.
Bolivina amygdalæformis, Brady.
Chilostomella ovoidea, Reuss.
Lagena apiculata (Reuss).
„ *aspera*, Reuss.
„ *elongata* (Ehrenberg).
„ *formosa*, Schwager.
„ *globosa* (Montagu).
„ *gracillima* (Seguenza).

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Lagena interrupta, Williamson.
„ *lævigata* (Reuss).
„ *lævis* (Montagu).
„ *longispina*, Brady.
„ *marginata* (Walker and Boys).
„ *orbignyana* (Seguenza).
„ *striata* (d'Orbigny).
„ *trigono-ornata*, Brady.
Nodosaria communis, d'Orbigny.
„ (*Glandulina*) *lævigata*, d'Orbigny.
Polymorphina angusta, Egger.
Uvigerina asperula, Czjzek.
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *dubia*, Egger.
× *Globigerina rubra*, d'Orbigny.
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Pullenia obliquiloculata*, Parker and Jones.
Sphæroidina bulloides, d'Orbigny.
× „ *dehiscens*, Parker and Jones.
Truncatulina ungeriana (d'Orbigny).
„ *wuellerstorfi* (Schwager).
× *Pulvinulina menardii* (d'Orbigny).
„ *partschiana* (d'Orbigny).
„ *pauperata*, Parker and Jones.
× „ *tumida*, Brady.
„ *umbonata*, Reuss.
Rotalia orbicularis, d'Orbigny.
„ *soldanii*, d'Orbigny.
Nonionina umbilicatula (Montagu).

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station:—

Radiolaria (Haeckel, Zool. pt. 40).
Acrosphæra collina, Haeckel.
Coscinaspis isopora, Haeckel.
Psilomelissa galeata, Haeckel.
Sethoconus trochus, Haeckel.
Dictyomitra macilenta, Haeckel.

In addition, the following are recorded in the note-books (March 1 and 2):—Oscillatoriaceæ, *Globigerina*, Medusæ and larvæ, Siphonophoræ and larvæ, Echinoderm larvæ (Holothurid and Asterid), *Sagitta*, Aphroditacean and other Annelid larvæ, Sipunculid larvæ, Tornaria, *Copilia*, *Setella*, *Saphirina*, *Hyperia*, Zoëæ and Nauplii, *Atlanta*, *Firoloida*, *Cymbulia* with mutilated animal, Pteropod and other shells, *Appendicularia*, small fishes (*Scopelus* with scales and phosphorescent spots, young of sword-fish, and small Percoid). A number of small whales (black fish) were seen near the ship.

At Admiralty Islands.

The Challenger remained at the Admiralty Islands from March 3 to 10, 1875, during which time the naturalists were engaged making collections and observations on shore, and Mr. Murray took several dredgings in shallow water from the steam pinnace (for description of the islands see *Narr. Chall. Exp.*, vol. i. pp. 696–730). The deposits in Nares Harbour in 16 to 25 fathoms were Coral Sands and Muds, containing 86·87 per cent. of carbonate of lime; the beach of the main island was composed of sand, containing 27·30 per cent. of carbonate of lime. The following species are recorded in the Zoological Reports from the vicinity of the Admiralty Islands:—

Animals from Admiralty Islands.

Keratosa (Polejaeff, Zool. pt. 31).

Carteriospongia otahitica (Esper). Numerous specimens (Wild Island, reefs); obtained at no other locality by the Challenger.

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ALCYONARIA (Wright and Studer, Zool. pts. 64 and 81). ADMIRALTY ISLANDS.

Muricella gracilis, n.sp. One specimen (16 to 20 fathoms); obtained at no other locality.

Suberogorgia suberosa (Pallas). One specimen (16 to 25 fathoms); obtained at no other locality by the Challenger. A widely-distributed species.

Spongodes nephthyæformis, n.sp. One specimen (25 fathoms); obtained at no other locality.

Siphonogorgia pallida, n.sp. Two specimens; obtained at no other locality.

CRINOIDEA (Carpenter, Zool. pt. 60).

Actinometra simplex, n.sp. One specimen (16 to 25 fathoms); obtained at no other locality.

„ *parvicirra* (Müller). One specimen (16 to 20 fathoms); for distribution see the Cape.

ASTEROIDEA (Sladen, Zool. pt. 51).

Astropecten polyacanthus, Müller and Troschel. Several specimens (16 to 25 fathoms); for distribution see Port Jackson.

„ *velitaris*, Martens. One specimen (16 to 25 fathoms); obtained also at Amboina.

Echinaster eridanella, Müller and Troschel. (16 to 25 fathoms); obtained at no other locality by the Challenger. Recorded from New Caledonia and New Ireland.

ECHINOIDEA (Agassiz, Zool. pt. 9).

Maretia planulata (Leske). (16 to 25 fathoms); obtained also at Port Jackson and Fiji.

ANNELIDA (M'Intosh, Zool. pt. 34).

Thalenessa digitata, n.sp. One specimen (16 to 25 fathoms); obtained at no other locality.

OSTRACODA (Brady, Zool. pt. 3).

Macrocypris decora, Brady. (16 to 25 fathoms); for distribution see Station 24.

Bairdia globulus, n.sp. (16 to 25 fathoms); obtained at no other locality.

„ *foveolata*, Brady. (16 to 25 fathoms); for distribution see Station 33.

„ *crosskeiana*, Brady. (16 fathoms); for distribution see Tongatabu.

„ *tuberculata*, Brady. (16 to 25 fathoms); obtained at no other locality by the Challenger. Recorded from Mauritius.

Admiralty Islands.

Cythere obtusalata, n.sp. (16 to 25 fathoms); obtained also at Station 162.

„ *prava* (Baird). (16 to 25 fathoms); obtained at no other locality by the Challenger. Recorded from Mediterranean.

„ *irrorata*, n.sp. (16 to 25 fathoms); obtained at no other locality.

„ *tricristata*, n.sp. (16 to 25 fathoms); obtained also at Port Jackson.

Loxoconcha pumicosa, n.sp. (16 fathoms); obtained also at Station 187.

Xestoleberis tumefacta, n.sp. (16 fathoms); obtained at no other locality.

Cytherella semitalis, Brady. (16 fathoms); for distribution see Station 187.

Anomura (Henderson, Zool. pt. 69).

Cœnobita clypeata (Herbst). One specimen (Wild Island); obtained at no other locality by the Challenger. Recorded from Indo-Pacific region.

„ *rugosa*, M.-Edwards. Several specimens (Tracey and Wild Islands); obtained also at Fiji, New Hebrides, Arrou Islands, and Tahiti.

Pagurus dearmatus, n.sp. One specimen (16 to 25 fathoms); obtained at no other locality.

Spiropagurus spiriger (De Haan). One specimen (16 to 25 fathoms); for distribution see Torres Strait.

Brachyura (Miers, Zool. pt. 49).

Neptunus (*Achelous*) *granulatus* (M.-Edwards). One specimen (16 to 25 fathoms); obtained also at Philippines.

Cardiosoma carnifex (Herbst). Four specimens (Tracey Island); obtained also at Fiji and Tahiti.

Sesarma (*Holometopus*) *aubryi*, M.-Edwards. Several specimens (Wild Island, beach); obtained also at New Hebrides and Arrou Islands.

Lamellibranchiata (Smith, Zool. pt. 35).

Mactra achatina, Chemnitz. (16 to 25 fathoms); obtained at no other locality by the Challenger. Recorded from Indian and Pacific Oceans.

„ *incerta*, n.sp. (16 to 25 fathoms); obtained at no other locality.

Gasteropoda (Watson, Zool. pt. 42).

Trochus (*Chrysostoma*) *paradoxus* (Born). (Wild Island); obtained also at Philippines.

Vitularia crenifera (Montrouzier). (16 to 25 fathoms); obtained at no other locality by the Challenger. Recorded from New Caledonia.

Harpa nobilis, Lamarck. (16 to 25 fathoms); obtained at no other locality by the Challenger. Recorded from Pacific islands.

Cassis (*Casmaria*) *turgida*, Reeve. (16 to 25 fathoms); obtained at no other locality by the Challenger. Recorded from Philippines.

Dolium perdix (Linné). (Wild Island, shore); obtained at no other locality by the Challenger. A widely-distributed species.

Strombus (*Gallinula*) *variabilis*, Swainson. (16 to 25 fathoms); obtained at no other locality by the Challenger. Recorded from Australia.

Capulus japonicus, Adams. (16 to 25 fathoms); obtained at no other locality by the Challenger. Recorded from Japan.

Turritella admirabilis, n.sp. (16 to 25 fathoms); obtained at no other locality.

Cerithium (*Vertagus*) *martinianum*, Pfeiffer. (Tracey Island); obtained at no other locality by the Challenger. Recorded from Indian Ocean.

Polyzoa (Busk, Zool. pt. 30).

Scrupocellaria securifera, n.sp. Obtained at no other locality.

Retepora simplex, n.sp. Obtained also at Philippines.

Lepralia lonchæa, n.sp. Obtained at no other locality.

Fishes (Günther, Zool. pt. 6).

Mesoprion monostigma, C.V. (Nares Harbour); obtained at no other locality by the Challenger.

Sphærodon grandoculis, Forsk. (Nares Harbour); obtained also at Fiji.

Gerres macracanthus, Bleeker. (Nares Harbour); obtained at no other locality by the Challenger.

Pimelepterus waigiensis, Quoy and Gaimard. (Nares Harbour); obtained at no other locality by the Challenger.

Upeneus barberinus, C.V. (Nares Harbour); obtained at no other locality by the Challenger.

Sillago sihama, Forsk. (Nares Harbour); obtained at no other locality by the Challenger.

Caranx crumenophthalmus, Bl. (Nares Harbour); obtained also at Cape Verdes and Sandwich Islands.

Platax orbicularis, Forsk. (Nares Harbour); obtained also at Fiji.

Acantharus blochi, C.V. (Nares Harbour); obtained also at Fiji and Sandwich Islands.

Teuthis concatenata, C.V. (Nares Harbour); obtained at no other locality by the Challenger.

„ *vermiculata*, C.V. (Nares Harbour); obtained at no other locality by the Challenger.

„ *margaritifera*, C.V. (Nares Harbour); obtained at no other locality by the Challenger.

Lophius naresi, n.sp. (Nares Harbour); obtained also at Stations 204 and 219.

ADMIRALTY ISLANDS.

Belone linroides, Bleeker. (Nares Harbour); obtained at no other locality by the Challenger.

Clupea moluccensis, Bleeker. (Nares Harbour); obtained at no other locality by the Challenger.

Balistes maculatus, Gm. (North of Admiralty Islands); obtained at no other locality by the Challenger.

In the foregoing list 61 species are enumerated, of which 18 are new to science; 13 of the new species were not obtained elsewhere.

ORGANISMS FROM THE DEPOSIT.

FORAMINIFERA (Brady, Zool. pt. 22).—The following species of Foraminifera were observed during the examination of the deposit from 16 to 25 fathoms; the pelagic species, which make up only about 2 per cent. of the carbonate of lime present in the deposit, are marked thus × :—

Biloculina ringens (Lamarck), var. *denticulata*, Brady.
„ „ „ „ *striolata*, Brady.
Spiroloculina acutimargo, Brady.
„ *crenata*, Karrer.
„ *grata*, Terquem.
„ *impressa*, Terquem.
„ *limbata*, d'Orbigny.
Miliolina agglutinans (d'Orbigny).
„ *alveoliniformis*, Brady.
„ *circularis* (Bornemann).
„ *linnæana* (d'Orbigny).
„ *oblonga* (Montagu).
„ *parkeri*, Brady.
„ *pygmæa* (Reuss).
„ *reticulata* (d'Orbigny).
„ *separans*, Brady.
„ sp. (?).
Articulina lineata, Brady (?).
„ *sagra*, d'Orbigny.
„ *sulcata*, Reuss.
Hauerina circinata, Brady.
„ *compressa*, d'Orbigny.
„ *ornatissima* (Karrer).
Planispirina exigua, Brady.
Peneroplis pertusus (Forskål).
Orbitolites marginalis (Lamarck).
Alveolina boscii, Defrance.
Technitella legumen, Norman.
Sagenella frondescens, Brady.
Reophax scorpiurus, Montfort.
Placopsilina cenomana, d'Orbigny.
Textularia conica, d'Orbigny.
Textularia rugosa (Reuss).
„ *siphonifera*, Brady.
„ *trochus*, d'Orbigny.
„ sp. (?).
Verneuilina spinulosa, Reuss.
Clavulina angularis, d'Orbigny.
Bolivina nobilis, Hantken.
„ *textilarioides*, Reuss.
Lagena marginata (Walker and Boys).
„ *orbignyana* (Seguenza).
„ sp. (?).
Nodosaria hispida, d'Orbigny.
Sagrina columellaris, Brady.
„ *raphanus*, Parker and Jones.
× *Globigerina æquilateralis*, Brady.
× „ *inflata*, d'Orbigny.
× „ *rubra*, d'Orbigny.
× „ *sacculifera*, Brady.
Spirillina sp. (?).
× *Cymbalopora* (*Tretomphalus*) *bulloides* (d'Orbigny).
„ *poeyi* (d'Orbigny).
Discorbina orbicularis (Terquem).
Planorbulina larvata, Parker and Jones.
Truncatulina echinata, Brady.
„ *lobatula* (Walker and Jacob).
„ *præcincta* (Karrer).
„ *rostrata*, Brady.
„ *ungeriana* (d'Orbigny).
„ sp. (?).
Carpenteria monticularis, Carter.
„ sp. (?).
Pulvinulina lateralis (Terquem).

Pulvinulina repanda (Fichtel and Moll).
Calcarina defrancii, d'Orbigny.
„ *hispida*, Brady.
„ *spengleri*, Linné.
Tinoporus baculatus (Montfort ?), Carpenter.
Gypsina inhærens (Schultze).
„ *vesicularis* (Parker and Jones).
Polytrema miniaceum (Linné).
Polystomella craticulata (Fichtel and Moll).
„ *crispa* (Linné).
„ *macella* (Fichtel and Moll).
Amphistegina lessonii, d'Orbigny.
Operculina complanata (Defrance).
„ „ var. *granulosa*, Leymerie.
Heterostegina depressa, d'Orbigny.
Nummulites cumingii, Carpenter (?).

ADMIRALTY ISLANDS.

Surface Organisms.—The following species are recorded from the surface in the neighbourhood of the Admiralty Islands :—

ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Psilomelissa galeata, Haeckel.
Sethoconus trochus, Haeckel.
Dictyomitra macilenta, Haeckel.

HETEROPODA (Smith, Zool. pt. 72).

Carinaria cristata (Linné).

FISHES (Günther, Zool. pt. 78).

Psenes cyanophrys, C.V.

The following are recorded in the note-books:—*Rhizosolenia* (with *Vorticella* attached) and other Diatoms, spores of an Alga, Siphonophoræ, Echinoderm larvæ, *Balanoglossus* larvæ, Planarian larvæ, Copepods, Zoëæ, Pteropods, *Appendicularia*. A sword-fish about five feet long was seen to jump out of the water alongside the ship when leaving the harbour.

Station 219 (Sounding 357), Admiralty Islands to Yokohama (see Chart 34).

STATION 219.

March 10, 1875 ; lat. 1° 54′ S., long. 146° 39′ 40″ E.
Temperature of air at noon, 84°·8 ; mean for the day, 81°·7.
Temperature of water at surface, 84°·0.
Density at 60° F. at surface, 1·02571.
Depth, 150 fathoms ; deposit, Coral Mud.

At 1 P.M. got up steam. At 3.30 P.M. weighed anchor and proceeded out of Nares Harbour. At 4 P.M. suddenly found shoal water; stopped. At 4.15 P.M. proceeded, having passed over a $3\frac{3}{4}$ fathoms coral patch. At 4.45 P.M. stopped and sounded in 150 fathoms, a short distance outside Nares Harbour. Put over trawl, which came up at 5.30 P.M. with many specimens. At 6 P.M. proceeded under steam and sail.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Station 219. Animals from Trawl.

Actiniaria (Hertwig, Zool. pt. 73).

Corynactis (?) sp. One specimen.

Another Actinian, genus and species undetermined.

Corals (Moseley, Zool. pt. 7).

Caryophyllia clavus, Scacchi, var. *epithecata*, Duncan. One specimen; obtained at no other locality by the Challenger.

Thecopsammia elongata, n.sp. One specimen; obtained at no other locality.

Crinoidea (Carpenter, Zool. pt. 60).

Antedon tenuicirra, n.sp. Two specimens; obtained at no other locality.

Asteroidea (Sladen, Zool. pt. 51).

Luidia aspera, n.sp. Obtained also at Station 204 and Philippines.

Nymphaster bipunctus, n.g., n.sp. Obtained at no other locality.

Palmipes diaphanus, n.sp. Obtained at no other locality.

Tarsaster stoichodes, n.g., n.sp. Obtained at no other locality. Only species of the genus.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophiopeza æqualis, n.sp. Obtained at no other locality.

Ophiomusium lunare, n.sp. Obtained at no other locality.

Ophiacantha serrata, n.sp. Obtained at no other locality.

Ophiocamax vitrea, n.g., n.sp. Obtained also at Stations 192, 201, 204, and 209.

Ophiocopa spatula, n.g., n.sp. [See *Bull. Mus. Comp. Zoöl.*, vol. x. pp. 266, 267, 1883].

Echinoidea (Agassiz, Zool. pt. 9).

Micropyga tuberculata, n.g., n.sp. Obtained also at Stations 174, 204, and 209.

Asthenosoma gracile, n.sp. Obtained also at Stations 169, 184, and 200.

Temnopleurus reynaudi, Agassiz. Obtained also at Stations 166 and 192.

Echinus elegans, Düben and Koren. Obtained also at Stations 46 and 135.

Peronella decagonalis (Lesson). For distribution see Station 172.

Holothurioidea (Théel, Zool. pts. 13 and 39).

Ilyodæmon maculatus, n.g., n.sp. Two specimens; obtained also at Stations 192 and 209. Only species of the genus.

Holothuria murrayi, n.sp., var. *parva*, nov. One specimen; the species obtained also at Stations V. and 300.

MACRURA (Spence Bate, Zool. pt. 52). STATION 219.

Panulirus angulatus, n.sp. One specimen ; obtained at no other locality.
Penæus philippinensis, n.sp. Ten specimens ; obtained also at Stations 192 and 201.
Sicyonia lævis, n.sp. One specimen ; obtained at no other locality.
Plesionika spinipes, n.g., n.sp. Eight specimens ; obtained at no other locality.
,, *unidens*, n.g., n.sp. Four specimens ; obtained at no other locality.
Stylodactylus bimaxillaris, n.sp. One specimen ; obtained at no other locality.

ANOMURA (Henderson, Zool. pt. 69).

Munida squamosa, n.sp. About twenty specimens ; obtained at no other locality.
,, *proxima*, n.sp. Three specimens ; obtained at no other locality.
,, *inornata*, n.sp. Three specimens ; obtained at no other locality.
Elasmonotus lævigatus, n.sp. One specimen ; obtained at no other locality.

BRACHYURA (Miers, Zool. pt. 49).

Platymaia wyville-thomsoni, n.g., n.sp. One specimen ; obtained at no other locality. Only species of the genus. Recorded subsequently from Indian Ocean (" Investigator ").
Ergasticus naresii, n.sp. One specimen ; obtained at no other locality.
Lupocyclus (Parathranites) orientalis, n.sp. One specimen ; obtained also at Station 192.
Paracycloïs milne-edwardsii, n.g., n.sp. One specimen ; obtained at no other locality. Only species of the genus.

PYCNOGONIDA (Hoek, Zool. pt. 10).

Ascorhynchus orthorhynchus, n.sp. One specimen ; obtained at no other locality.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Cryptodon watsoni, n.sp. Obtained at no other locality.

GASTEROPODA (Watson, Zool. pt. 42).

Phos naucratoris, n.sp. One specimen ; obtained at no other locality.

FISHES (Günther, Zool. pts. 6, 57, and 78).

Peristethus liorhynchus, Günther. Obtained at no other locality by the Challenger.
Champsodon vorax, Günther. Obtained also at Stations 192 and 204.
Lophius naresi, n.sp. Obtained also at Station 204 and Admiralty Islands.
Pseudorhombus ocellatus, n.sp. Obtained at no other locality.

Station 219.

Nematops microstoma, n.g., n.sp. Obtained at no other locality. Only species of the genus.

Echeneis albescens, Schleg. Obtained at no other locality by the Challenger.

The Station-book records also an Aphroditacean.

Excluding Protozoa, over 100 specimens of invertebrates and fishes were obtained at this Station, belonging to 57 species, of which 35 are new to science, including representatives of 10 new genera; 26 of the new species and 5 new genera were not obtained elsewhere.

Organisms from the Deposit.

Pteropoda (Pelseneer, Zool. pt. 65).—The following species of Pteropoda were observed in the deposit from this Station :—

Limacina inflata (d'Orbigny).
„ *trochiformis* (d'Orbigny).
„ *bulimoides* (d'Orbigny).
Clio (*Creseis*) *virgula* (Rang).
„ („) *conica* (Eschscholtz).
„ („) *acicula* (Rang).
„ (*Hyalocylix*) *striata* (Rang).
„ (*Styliola*) *subula*, (Quoy and Gaimard).
Clio pyramidata, Linné.
Cavolinia quadridentata (Lesueur).
„ *trispinosa* (Lesueur), young (= *Cleodora compressa*, Souleyet).
„ *longirostris* (Lesueur), young (= *Hyalæa lævigata*, d'Orbigny).
„ *inflexa* (Lesueur), young (= *Hyalæa depressa*, d'Orbigny).

Organisms from Surface-Nets.

Surface Organisms.—The following are recorded in the note-books from the surface :—*Pyrocystis*, *Globigerina*, Radiolaria, Medusæ, Siphonophoræ, *Sagitta*, *Cypridina*, *Copilia* and other Copepods, larval Cirripeds, Mysids, Zoëæ, Pteropods, *Appendicularia*, *Doliolum*, Ascidian larvæ, and fish eggs.

Station 220.

Station 220 (Sounding 358), Admiralty Islands to Yokohama (see Chart 31 and Diagram 16).

March 11, 1875 ; lat. 0°42′ S., long. 147° 0′ E.
Temperature of air at noon, 80°·3 ; mean for the day, 80°·1.
Temperature of water:—

	°		°
Surface, ...	83·8	400 fathoms, . . .	43·1
50 fathoms, . . .	81·6	500 „ . . .	41·0
100 „ . . .	77·1	600 „ . . .	39·7
150 „ . . .	64·0	700 „ . . .	39·0
200 „ . . .	52·0	800 „ . . .	38·2
250 „ . . .	48·5	900 „ . . .	37·5
300 „ . . .	46·2	1000 „ . . .	36·8
350 „ . . .	44·6	Bottom, . . .	36·2

Density at 60° F. at surface, 1·02580 ; 350 fathoms, 1·02551 ; bottom, 1·02560. Station 220.
Depths, 1100 fathoms ; deposit, Globigerina Ooze, containing 63·75 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 9 A.M. shortened and furled sails, and got up steam to sound. At 9.30 A.M. stopped and sounded in 1100 fathoms, about 80 miles due N. of the N.E. extremity of Admiralty Islands. At 11.30 A.M. put trawl over. At 1.30 P.M. obtained serial temperatures down to the bottom. At 4 P.M. hove up trawl with some pumice-stones and a few specimens. At 5.30 P.M. completed temperatures. Owing to strong surface current drifting ship away from sounding-line, 200 fathoms were deducted from the 1300 fathoms run out, to allow for the angle of the line, but the temperature curve seemed to indicate the actual depth to be about 1200 fathoms. At 6 P.M. made all plain sail.

Distance at noon from Guam Island, 850 miles. Made good 82 miles. Amount of current 22 miles, direction W.

The following species are recorded in the Zoological Reports from the trawl at this Station :— Animals from Trawl.

Deep-Sea Keratosa (Haeckel, Zool. pt. 82).

Psammina globigerina, n.g., n.sp. Obtained at no other locality.

Macrura (Spence Bate, Zool. pt. 52).

Gennadas parvus, n.g., n.sp. Three specimens ; for distribution see Station 45.

Oplophorus typus, M.-Edwards. One specimen ; obtained also at Station 196.

Cephalopoda (Hoyle, Zool. pt. 44).

Eledonella diaphana, n.sp. One specimen ; obtained at no other locality.

Fishes (Günther, Zool. pt. 57).

Melamphaës crassiceps, n.sp. One specimen ; obtained also at Stations 107, 120, and 146.

Gonostoma microdon, n.sp. One specimen ; for distribution see Station 23.

Another shrimp and another fish are recorded in the Station-book.

Excluding Protozoa, about 10 specimens were obtained at this Station, belonging to 8 species, of which 5 are new to science, including representatives of 2 new genera ; 2 of the new species were not obtained elsewhere.

Station 220. Organisms from the Deposit.

Radiolaria (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :—

Clathrococcus stalactites, Haeckel.
Coccodiscus lamarckii, Haeckel.
Sethamphora microstoma, Haeckel.
Podocyrtis divergens, Haeckel.
Alacorys bismarckii, Haeckel.
Eucyrtidium ehrenbergii, Haeckel.
Siphocampe quadrantalis, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following are recorded in the note-books from the surface at this Station :—

Pyrocystis, Diatoms, *Globigerina*, *Orbulina*, Medusæ, *Diphyes* and other Siphonophoræ, Echinoderm larvæ, *Sagitta*, *Alciopa*, Aphroditacean and tubicolous Annelid larvæ, *Copilia*, *Saphirina*, and other Copepods, *Hyperia*, *Oxycephalus*, *Caprella* (probably from the ship's side), Schizopods, *Lucifer*, Zoëæ, *Atlanta*, *Firoloida*, *Pterotrachea*, Pteropods, *Appendicularia*, *Salpa*, *Doliolum*, young of sword-fish and other small fishes.

Station 221.

Station 221 (Sounding 359), Admiralty Islands to Yokohama (see Chart 31 and Diagram 16).

March 13, 1875 ; lat. 0° 48′ N., long. 148° 41′ E.
Temperature of air at noon, 83°·0 ; mean for the day, 81°·9.
Temperature of water :—

	°		°
Surface,	83·8	180 fathoms,	50·6
10 fathoms,	83·0	190 „	50·2
20 „	82·8	200 „	49·9
30 „	82·4	300 „	48·3
40 „	82·0	400 „	44·2
50 „	81·5	500 „	41·3
60 „	81·0	600 „	39·8
70 „	80·4	700 „	38·6
80 „	78·5	800 „	37·8
90 „	75·0	900 „	37·1
100 „	71·2	1000 „	36·7
110 „	67·2	1125 „	36·3
120 „	63·2	1225 „	36·0
130 „	59·4	1325 „	35·7
140 „	55·6	1425 „	35·4
150 „	53·1	1525 „	35·4
160 „	51·8	Bottom,	35·4
170 „	51·2		

Station 221.

Density at 60° F.:—

Surface,	1·02624	100 fathoms,	1·02625
10 fathoms,	1·02596	200 „	1·02574
20 „	1·02602	300 „	1·02562
50 „	1·02616	350 „	1·02565

Depth, 2650 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5.45 A.M. got up steam, shortened and furled sails, and proceeded under steam. At 6.30 A.M. sounded in 2650 fathoms. At 10 A.M. obtained serial temperatures down to 1525 fathoms. At 12.30 P.M. completed observations and made all plain sail.

Distance at noon from Guam Island, 789 miles. Made good 56 miles. Amount of current 14 miles, direction S. 82° W.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station:—

Radiolaria (Haeckel, Zool. pt. 40).

Psilomelissa galeata, Haeckel.
Sethoconus trochus, Haeckel.
Dictyomitra macilenta, Haeckel.

Schizopoda (Sars, Zool. pt. 37).

Euphausia pellucida, Dana.

Macrura (Spence Bate, Zool. pt. 52).

Mastigopus dorsispinalis, n.sp.
Mastigopus sp. (?).
Elaphocaris sp. (?) (= Zoëa of *Sergestes*).

Cephalopoda (Hoyle, Zool. pt. 44).

Ommastrephes oualaniensis (Lesson).

Fishes (Günther, Zool. pt. 78).

Psenes cyanophrys, C.V.

In addition, the following are recorded in the note-books (March 13 to 15):—*Peridinium* (two species), *Pyrocystis*, *Ethmodiscus* and other Diatoms (*Planktoniella*), *Globigerina*, *Orbulina*, Medusæ, *Diphyes* and other Siphonophoræ, *Cydippe*, Holothurian larvæ, *Sagitta*, *Alciopa*, Planarian and small green larvæ, *Calanus*, *Copilia*, *Saphirina*, *Corycæus*, *Pontella plumata*, Hyperids, *Oxycephalus*, Phronimids, *Lucifer*, *Sergestes*, *Amphion* (?), Zoëæ, *Atlanta*, *Macgillivraya*, *Pneumonoderma*, *Thecurybia* [= *Halopsyche*], *Hyalæa* [= *Cavolinia*], *Styliola*, and other Pteropods, *Octopus* (2½ inches in length) and another small Cephalopod, *Appendicularia*, *Doliolum*, *Salpa*, Percoid fish (2 inches in length) and other small fishes. On the 13th a male shark (*Carcharias lamia*), 5 feet in length, was caught; it had nothing in its stomach. The white corpuscles in the blood of this shark were under observation for several hours, and exhibited active amœboid movements. On the 14th two sharks, and one or two

Station 221. specimens of *Coryphæna* were seen, as well as some fishes jumping about the surface of the water. The screw was taken up and found to be covered by a small *Tubularia*, along with *Lepas*, *Balanus*, *Caprella*, and a small crab.

Willemoes-Suhm writes: "*Lucifer* was plentiful and I found its larva in abundance, and also some Zoëæ which, I think, belonged to it. They were much smaller than the corresponding stages of *Sergestes*, but I afterwards found that the full-grown Zoëa of *Lucifer* was about the same length as the spiny *Elaphocaris* (Zoëa of *Sergestes*), and differed only in the absence of spines."

Moseley writes: "On the 15th the tow-net was filled with a *Corycæus*, the same species as that figured by Suhm from the Atlantic, with the prominences of the body for the reception of the nervous parts of the enormously-enlarged eyes."

Station 222. **Station 222** (Sounding 360), Admiralty Islands to Yokohama (see Chart 31 and Diagram 16).

March 16, 1875; lat. 2° 15′ N., long. 146° 16′ E.
Temperature of air at noon, 82°·8; mean for the day, 81°·9.
Temperature of water :—

	°		°
Surface,	82·8	180 fathoms,	49·3
10 fathoms,	82·8	190 „	48·9
20 „	82·6	200 „	48·5
30 „	82·4	300 „	45·5
40 „	82·2	400 „	43·2
50 „	82·0	500 „	41·1
60 „	81·8	600 „	39·3
70 „	81·7	700 „	38·0
80 „	81·2	800 „	37·1
90 „	80·3	900 „	36·5
100 „	78·9	1000 „	36·1
110 „	76·0	1100 „	35·9
120 „	63·2	1200 „	35·7
130 „	55·6	1300 „	35·5
140 „	52·7	1400 „	35·2
150 „	51·0	1500 „	35·2
160 „	50·2	Bottom,	35·2
170 „	49·7		

Density at 60 F. :—

Surface,	1·02634	200 fathoms,	1·02583
50 fathoms,	1·02628	300 „	1·02560
70 „	1·02603	380 „	1·02561
100 „	1·02605	Bottom,	1·02560

Depth, 2450 fathoms; deposit, Red Clay, containing 6·86 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.). Station 222.

At 5 A.M. got up steam. At 5.30 A.M. shortened and furled sails, and proceeded under steam. At 6 A.M. sounded in 2450 fathoms. Obtained serial temperatures down to 1500 fathoms. The wind changed to a favourable quarter, and the trawling was postponed to a future day. At 9.40 A.M. completed temperatures and made all plain sail northwards. Petrels (*Puffinus opisthomelas*), *Tachypetes*, and *Phæthon* were seen.

Distance at noon from Guam Island, 660 miles. Made good 69 miles. Amount of current 28 miles, direction S. 84° W.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station :— Organisms from Surface-Nets.

Radiolaria (Haeckel, Zool. pt. 40).

Druppula cocos, Haeckel.
Xiphatractus dasypus, Haeckel.
Amphipyle amphiceros, Haeckel.
Pleuraspis pyramidalis, Haeckel.
Psilomelissa galeata, Haeckel.
Sethoconus trochus, Haeckel.
Dictyomitra macilenta, Haeckel.

Siphonophoræ (Haeckel, Zool. pt. 77).

Porpalia prunella, n.g., n.sp.
Diphyopsis angustata (Eschscholtz).

Heteropoda (Smith, Zool. pt. 72).

Carinaria cristata (Linné), jun. (?).

Pteropoda (Pelseneer, Zool. pt. 58).

Pnemonoderma peroni, Lamarck.

Tunicata (Herdman, Zool. pt. 76).

Pyrosoma elegans, Lesueur (?).
,, sp. (?).
Salpa cordiformis-zonaria, Quoy and Gaimard—Pallas.
,, *cylindrica*, Cuvier.
,, *runcinata* - *fusiformis*, Chamisso—Cuvier.
,, *democratica* - *mucronata*, Forskåhl (?).
,, *nitida*, n.sp.

Fishes (Günther, Zool. pt. 78).

Leptocephalus tænia (young).

In addition, the following are recorded in the note-books (March 16 to 18):—*Pyrocystis*, *Ethmodiscus* and other large Diatoms, *Peridinium* (*in catena*), yellow masses containing Coccospheres and Rhabdospheres along with Diatoms and Infusoria, many *Globigerinæ* and *Pulvinulinæ*, *Tintinnus* and other Infusoria, Medusæ, Echinoderm larvæ, *Sagitta*, *Alciopa*, Aphroditacean larvæ, *Cypridina*, *Calanus*, *Corycæus*, *Copilia*, *Saphirina*, *Pontella*, Hyperids, *Phronima*, *Oxycephalus oceanus*, *Siriella*, *Euphausia*, *Sergestes*, *Lucifer*, *Amphion* (?), Zoëæ, *Halobates*, *Ianthina*, *Glaucus*, *Atlanta*, *Cardiopoda*, *Macgillivraya*, *Hyalæa* [= *Cavolinia*], *Styliola*, *Heterofusus* [= *Limacina*],

Station 222. small Cephalopods, *Appendicularia*, *Doliolum*, *Balistes* and other small fishes. On the 18th a female shark (*Carcharias lamia*), about 7 feet long, was caught. The specimens of *Halobates*, *Balistes*, &c., were picked up by Mr. Murray when away in the dingey on the 18th. *Collosphæra* was observed in patches in considerable abundance, but on the whole the water was exceedingly pure, and the white bag of the tow-net could be seen at a great depth.

Station 223. **Station 223** (Sounding 361), Admiralty Islands to Yokohama (see Chart 31 and Diagram 16).

March 19, 1875 ; lat. 5° 31′ N., long. 145° 13′ E.
Temperature of air at noon, 83°·5 ; mean for the day, 81°·1.
Temperature of water :—

	°		°
Surface,	82·0	180 fathoms,	48·8
10 fathoms,	81·7	190 „	48·2
20 „	81·7	200 „	47·7
30 „	81·7	300 „	45·8
40 „	81·7	400 „	44·3
50 „	81·7	500 „	42·8
60 „	81·7	600 „	41·3
70 „	81·7	700 „	40·0
80 „	81·7	800 „	38·8
90 „	79·0	900 „	37·7
100 „	70·9	1000 „	36·8
110 „	63·5	1100 „	36·1
120 „	59·5	1200 „	35·7
130 „	56·3	1300 „	35·5
140 „	53·8	1400 „	35·5
150 „	51·6	1500 „	35·5
160 „	50·0	Bottom,	35·5
170 „	49·3		

Density at 60° F. :—

Surface,	1·02595	200 fathoms,	1·02566
10 fathoms,	1·02587	300 „	1·02556
20 „	1·02575	400 „	1·02567
50 „	1·02589	Bottom,	1·02578
100 „	1·02569		

Depth, 2325 fathoms ; deposit, Globigerina Ooze, containing 52·47 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Station 223.

At 6 A.M. stopped and put trawl over, veering 2000 fathoms. At 7.40 A.M. sounded in 2325 fathoms ; veered trawl rope. At 10.30 A.M. obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in bottom water, and amounted to 61·9 milligrammes per litre. At 12.30 P.M. commenced heaving in trawl, which came up foul at 4 P.M., containing only a few specimens and pumice-stones. Made sail and proceeded towards the Mariana or Ladrone Islands. A boatswain bird fell on the deck from the rigging, having probably been injured through the manipulation of the ropes, and a noddy tern came on board ; a large flock of petrels or shearwaters seen at the Admiralty Islands was observed near the ship.

Distance at noon from Guam Island, 464 miles ; from Elato Island, Caroline Islands, 90 miles ; from Nile Shoal, about 30 miles. Made good 70 miles. Amount of current 8 miles, direction N. 21° E.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Crinoidea (Carpenter, Zool. pt. 32).

Hyocrinus bethellianus, Wyville Thomson, n.g., n.sp. (?). One young specimen ; obtained also at Stations 106 and 147. Only species of the genus.

Fishes (Günther, Zool. pt. 57).

Gonostoma microdon, n.sp. Two specimens ; for distribution see Station 23.

The Station-book records also a Peneid shrimp, and small siliceous Sponges attached to pumice-stones.

Surface Organisms.—During the forenoon two tow-nets were carried away by sharks, and a third caught in the screw ; in the afternoon a few hauls were taken and the following procured :—*Pyrocystis*, *Peridinium* (*in catena*), *Ethmodiscus*, *Coscinodiscus*, and other Diatoms (*Planktoniella*), *Globigerina*, *Orbulina*, Radiolaria, Medusæ, Siphonophoræ, Ctenophoræ, Echinoderm larvæ, *Sagitta*, Aphroditacean and tubicolous Annelids, *Calanus*, *Copilia*, *Pontella*, *Saphirina*, *Hyperia*, Phronimids, *Euphausia*, *Lucifer*, *Sergestes* larvæ, *Atlanta*, *Firoloida*, *Pneumonoderma*, *Styliola*, *Hyalæa* [= *Cavolinia*], and other Pteropods, *Appendicularia*, *Doliolum*. A *Salpa* came up on the net of the trawl, and in its stomach were Acanthometræ, *Coscinodiscus*, Coccospheres, and other minute organisms. A young male shark (*Carcharias lamia*) was caught ; it had *Caligus* and another parasite on it.

STATION 224. **Station 224** (Sounding 362), Admiralty Islands to Yokohama (see Chart 31 and Diagram 16).

March 21, 1875 ; lat. 7° 45′ N., long. 144° 20′ E.
Temperature of air at noon, 82°·3 ; mean for the day, 80°·6.
Temperature of water :—

	°		°
Surface,	81·2	180 fathoms,	48·9
10 fathoms,	81·5	190 ,,	48·6
20 ,,	81·1	200 ,,	48·3
30 ,,	80·6	300 ,,	45·7
40 ,,	80·0	400 ,,	43·4
50 ,,	79·5	500 ,,	41·3
60 ,,	79·0	600 ,,	39·5
70 ,,	78·1	700 ,,	38·2
80 ,,	75·0	800 ,,	37·2
90 ,,	68·5	900 ,,	36·7
100 ,,	63·2	1000 ,,	36·3
110 ,,	59·6	1100 ,,	36·0
120 ,,	56·7	1200 ,,	35·8
130 ,,	54·3	1300 ,,	35·6
140 ,,	52·5	1400 ,,	35·4
150 ,,	51·0	1500 ,,	35·4
160 ,,	49·9	Bottom,	35·4
170 ,,	49·3		

Density at 60° F. :—

Surface,	1·02585	200 fathoms,	1·02556
10 fathoms,	1·02564	300 ,,	1·02556
25 ,,	1·02553	400 ,,	1·02556
50 ,,	1·02569	Bottom,	1·02567
100 ,,	1·02564		

Depth, 1850 fathoms ; deposit, Globigerina Ooze, containing 79·20 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4 A.M. got up steam. At 5.30 A.M. shortened and furled sails, and at 6 A.M. proceeded under steam. At 7 A.M. sounded in 1850 fathoms. At 8 A.M. put dredge over. At noon obtained serial temperatures down to 1500 fathoms. At 1 P.M. commenced heaving in dredge, which came up at 3.30 P.M. with a large quantity of ooze and a few specimens. Made sail and proceeded towards Japan. During this and the following day gannets were occasionally observed from the ship.

Distance at noon from Faraulep Island, Caroline Islands, 52 miles ; from Guam Island, 330 miles. Made good 85 miles. Amount of current 10 miles, direction W.

Station 224. Animals from Dredge.

The following species are recorded in the Zoological Reports from the dredge at this Station :—

Corals (Moseley, Zool. pt. 7).

Bathyactis symmetrica (Pourtalès). Widely distributed (see Station 24).

Asteroidea (Sladen, Zool. pt. 51).

Styracaster armatus, n.g., n.sp. Obtained at no other locality. Recorded subsequently from Indian Ocean (" Investigator ").

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha undulata, n.sp. Obtained at no other locality.
Ophiomusium corticosum, n.sp. Obtained at no other locality.

Ostracoda (Brady, Zool. pt. 3).

Cythere dictyon, n.sp. Widely distributed (see Station 24).
Cytheropteron mucronalatum, n.sp. Obtained also at Stations 70, 246, 296, 300, and 302.

Excluding Protozoa, 7 specimens of invertebrates were obtained at this Station, belonging to 6 species, of which 5 are new to science, including representative of 1 new genus ; 3 of the new species were not obtained elsewhere.

Organisms from the Deposit.

The following species of Radiolaria and Foraminifera were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :—

Radiolaria (Haeckel, Zool. pt. 40).

Stylosphæra jugata, Haeckel.
Amphisphæra apollo, Haeckel.
Artiscus panarius, Haeckel.
Stylartus bipolaris, Haeckel.
Phacodiscus rotula, Haeckel.
Larnacalpis macrococcus, Haeckel.
Dizonium pleuracanthum, Haeckel.
Tetrapyle pleuracantha, Haeckel.
Octopyle transversaria, Haeckel.
„ *decastyle*, Haeckel.
Staurotholus decastylus, Haeckel.
Cubotholus octoceras, Haeckel.
Trissocircus lentellipsis, Haeckel.
Lithotympanum spinosum, Haeckel.
Lithocubus geometricus, Haeckel.
Tricolospyris leibnitziana, Haeckel.
Peridium palmipes, Haeckel.
Calpophæna hexarrhabda, Haeckel.
Alacorys guilelmi, Haeckel.
Stichopera serrata, Haeckel.
Cyrtophormis cingulata, Haeckel.
Eucyrtidium armatum, Haeckel.
Lithocampe multiseriata, Haeckel.
„ *polycola*, Haeckel.
Aulospathis hexodon, Haeckel.
Challengeron fergusoni, Haeckel.

Station 224.

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 88 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
„ „ var. *murrhyna*, Schwager.
Miliolina venusta (Karrer).
Psammosphæra fusca, Schulze.
Hyperammina ramosa, Brady.
„ *vagans*, Brady.
Aschemonella catenata (Norman).
Reophax dentaliniformis, Brady.
„ *nodulosa*, Brady.
Haplophragmium canariense (d'Orbigny).
„ *latidorsatum* (Bornemann).
Trochammina galeata, Brady.
„ *pauciloculata*, Brady.
„ *proteus*, Karrer.
„ *trullissata*, Brady.
Verneuilina pygmæa (Egger).
Gaudryina pupoides, d'Orbigny.
Clavulina communis, d'Orbigny.
Virgulina subsquamosa, Egger.
Lagena acuta (Reuss).
„ *auriculata*, Brady.
„ „ var. *substriata*, Brady.
„ *desmophora*, Rymer Jones.
„ *fimbriata*, Brady.
„ *formosa*, Schwager.
„ „ var. *comata*, Brady.
„ „ var. *favosa*, Brady.
„ *globosa* (Montagu).
„ *lævigata* (Reuss).
„ *marginata* (Walker and Boys).
„ *orbignyana* (Seguenza).
„ *seminiformis*, Schwager.
„ *stelligera*, Brady.
„ *unguiculata*, Brady.
Nodosaria roemeri, Neugeboren.
Cristellaria convergens, Bornemann.
Polymorphina angusta, Egger.
„ *rotundata* (Bornemann).
Uvigerina porrecta, Brady.
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ „ var. *triloba*, Reuss.
× „ *conglobata*, Brady.
× „ *digitata*, Brady.
× „ *dubia*, Egger (?).
× „ *helicina*, d'Orbigny.
× „ *rubra*, d'Orbigny.
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Pullenia obliquiloculata*, Parker and Jones.
„ *quinqueloba*, Reuss.
„ *sphæroides* (d'Orbigny).
Sphæroidina bulloides, d'Orbigny.
× „ *dehiscens*, Parker and Jones.
Truncatulina lobatula, Walker and Jacob.
„ *pygmæa*, Hantken.
„ *wuellerstorfi* (Schwager).
× *Pulvinulina canariensis* (d'Orbigny).
„ *exigua*, Brady.
„ *favus*, Brady.
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
× „ *patagonica* (d'Orbigny).
„ *pauperata*, Parker and Jones.
× „ *tumida*, Brady.
„ *umbonata*, Reuss.
Rotalia orbicularis, d'Orbigny.
„ *soldanii*, d'Orbigny.
Nonionina pompilioides (Fichtel and Moll).
„ *umbilicatula* (Montagu).

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Cenolarcus lentellipticus, Haeckel.
Amphipyle amphiptera, Haeckel.
Hexalaspis hexalastrum, Haeckel.
Plagoniscus nassellaris, Haeckel.
Psilomelissa galatea, Haeckel.
Lamprodiscus coscinodiscus, Ehrenberg.
Lithopera bacca, Ehrenberg.
Sethoconus trochus, Haeckel.
Theocyrtis trachelius, Haeckel.

Theocorys turgidula, Haeckel.
Dictyomitra macilenta, Haeckel.
Gazelletta furcata, Haeckel.

Amphipoda (Stebbing, Zool. pt. 67). Station 224.

Cystisoma spinosum (Fabricius).

In addition, the following are recorded in the note-books: — Oscillatoriaceæ (*Trichodesmium*), *Pyrocystis*, *Peridinium tripos*, Diatoms, *Globigerina*, *Orbulina*, *Pulvinulina*, Medusæ, Siphonophoræ, Echinoderm larvæ, *Sagitta*, Aphroditacean larvæ, Tornaria or *Balanoglossus* larvæ, *Pilidium* (?), *Calanus*, *Copilia*, *Saphirina*, and other Copepods, Phronimids, *Euphausia*, *Lucifer*, Zoëæ of *Sergestes*, larval Lamellibranchs, *Atlanta*, Pteropods and larvæ, *Appendicularia*, *Doliolum*, young *Pyrosoma*.

Station 225 (Sounding 363), Admiralty Islands to Yokohama (see Chart 31 and Diagram 16). Station 225.

March 23, 1875; lat. 11° 24′ N., long. 143° 16′ E.
Temperature of air at noon, 78°·5; mean for the day, 79°·2.
Temperature of water:—

	°		°
Surface,	80·2	180 fathoms,	50·1
10 fathoms,	80·2	190 „	49·7
20 „	80·0	200 „	49·2
30 „	80·0	300 „	43·2
40 „	80·0	400 „	41·2
50 „	80·0	500 „	39·9
60 „	80·0	600 „	38·6
70 „	78·0	700 „	37·9
80 „	74·8	800 „	37·3
90 „	70·6	900 „	36·9
100 „	67·0	1000 „	36·5
110 „	63·0	1100 „	36·1
120 „	59·4	1200 „	35·7
130 „	56·1	1300 „	35·5
140 „	53·7	1400 „	35·5
150 „	52·0	1500 „	35·5
160 „	51·3	Bottom,	35·2
170 „	50·7		

Density at 60° F.:—

Surface,	1·02568	200 fathoms,	1·02544
20 fathoms,	1·02565	300 „	1·02559
50 „	1·02566	400 „	1·02559
100 „	1·02582	Bottom,	1·02579

STATION 225. Depth, 4475 fathoms; deposit, Radiolarian Ooze, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4 A.M. got up steam. At 5.15 A.M. shortened and furled sails. At 6 A.M. proceeded under steam, and sounded in 4575 fathoms. The line was checked at 4575 fathoms, and the accumulator showed that the weights were off. It must, therefore, just have got to the bottom as it was checked. To leave no doubt as to the correctness of the sounding, the line was again let go at 12.30 P.M. with a weight of 4 cwts. (instead of 3 cwts. as usual), and the depth obtained amounted to 4475 fathoms, only 100 fathoms less than the first sounding. In the first sounding two thermometers and water-bottle were attached, but one of the thermometers came up broken. In the second sounding two thermometers and the pressure gauge were sent down. Both thermometers came up broken, and the pressure gauge was not able to record the pressure existing at this great depth, the greatest ascertained during the cruise of the Challenger. At 3 P.M. took serial temperatures down to 1500 fathoms. The carbonic acid was determined in bottom water and amounted to 31·2 milligrammes per litre. At 4 P.M. completed observations and made sail.

Distance at noon from No Sima lighthouse, 1420 miles. Made good 103 miles. Amount of current 19 miles, direction N. 78° W.

ORGANISMS FROM THE DEPOSIT. RADIOLARIA (Haeckel, Zool. pt. 40).—The following is a list of the species of Radiolaria observed in the deposit from this Station by Professor Haeckel and Dr. Dreyer. They belong almost entirely to the legions Nassellaria and Spumellaria, the number of the former to that of the latter being about 2 to 1; only two species of Phæodaria are noted, while the Acantharia are quite absent :—

I. SPUMELLARIA.—Of the Spumellaria the Discoidea are the most abundant, being about as numerous as the rest of the Spumellaria together; after the Discoidea come the Sphæroidea and Prunoidea, and lastly the Larcoidea, which are very sparingly represented.

Cenosphæra antiqua, Haeckel.
„ *cristata*, Haeckel.
„ *maxima*, Haeckel.
„ *mellifica*, Haeckel.
Carposphæra micrococcus, Haeckel.
„ *nobilis*, Haeckel.
Coronosphæra dialema, Haeckel.
Ethmosphæra polysiphonia, Haeckel.
Liosphæra polypora, Haeckel.
Mazosphæra hippotis, Haeckel.
„ *lævis*, Ehrenberg.
Trypanosphæra coronata, Haeckel.
Trypanosphæra terebrata, Haeckel.
„ *transformata*, Haeckel.
Acrosphæra inflata, Haeckel.
Amphisphæra uranus, Haeckel.
Xiphosphæra juno, Haeckel.
„ *pallas*, Haeckel.
Xiphostylus alcedo, Haeckel.
„ *edolius*, Haeckel.
„ *trogon*, Haeckel.
Caryostylus hexalepas, Haeckel.
Staurolonche straussii, Haeckel.
Hexastylus thaletis, Haeckel.

Hexastylus minimus, Haeckel.
,, *spiralis*, Haeckel.
Stylosphæra clio, Haeckel.
Cromyostylus gladius, Haeckel.
Stauroxiphus gladius, Haeckel.
Staurosphæra johannis, Haeckel.
Hexaloncbe octocolpa, Haeckel.
,, *philosophica*, Haeckel.
,, *rosetta*, Haeckel.
Hexalonchariuin octahedrum, Haeckel.
Hexacontium prionacanthum, Haeckel.
Acanthosphæra castanea, Haeckel.
,, *clavata*, Haeckel.
Heliosphæra cristata, Haeckel.
,, *pectinata*, Haeckel.
Haliomma melitomma, Haeckel.
,, *datura*, Haeckel.
Actinomma denticulatnm, Haeckel.
Cenellipsis faceta, Haeckel.
Ellipsidium datura, Haeckel.
Ellipsoxiphus atractus, Haeckel.
,, *bipolaris*, Haeckel.
Pipetella prismatica, Haeckel.
,, *tubulosa*, Haeckel.
Druppula drupa, Haeckel.
Prunulum pyrenium, Haeckel.
Stylatractus giganteus, Haeckel.
Pipetta tuba, Haeckel.
Spongoprunum atractus, Haeckel.
Spongodruppa terebintha, Haeckel.
Cyphonium facettarium, Haeckel.
,, *virgineum*, Haeckel.
Pipettaria fusaria, Haeckel.
Cypassis entomocora, Haeckel.
Cannartidium amphiconicum, Haeckel.
,, *mammiferum*, Haeckel.
Panarium pipettarium, Haeckel.
Peripanarium cenoconicum, Haeckel.
Cenodiscus phacoides, Haeckel.
Theodiscus christianus, Haeckel.
Heliodiscus polymorphus, Haeckel.
Sethodiscus lenticula, Haeckel.
,, *macrococcus*, Haeckel.
Phacodiscus clypeus, Haeckel.
,, *grandis*, Haeckel.
Phacostylus amphipyramis, Haeckel.
Perizona scutella, Haeckel.
Sethostylus hastatus, Haeckel.
Heliodiscus phacodiscus, Haeckel.
,, *sulcatus*, Haeckel.
Sethostaurus gigas, Haeckel.

Astrosestrum octacanthum, Haeckel. Station 225.
Astrophacus cingillum, Haeckel.
,, *apollinis*, Haeckel.
Lithocyclia cingulata, Haeckel.
,, *lenticula*, Haeckel.
Hymenactura archimedis, Haeckel.
Stomatodiscus osculatus, Haeckel.
Dictyastrum aculeatum, Haeckel.
Chitonastrum bathybium, Haeckel.
Triolena trispinosa, Haeckel.
Spongasteriscus ovatus, Haeckel (?).
Coccodiscus lamarckii, Haeckel.
Astrocyclia rotula, Haeckel.
Trigonactura rhopalastrella, Haeckel.
Archidiscus pyloniscus, Haeckel.
Porodiscus flustrella, Haeckel.
,, *orbicnlatus*, Haeckel.
,, *heterocyclus*, Haeckel.
,, *centrospira*, Haeckel.
,, *spiralis*, Haeckel.
Perichlamydium prætextnm, Haeckel.
Xiphodictya heliospira, Haeckel.
Stylodictya gracilis, Haeckel.
,, *heliospira*, Haeckel.
Rhopalastrum malleus, Haeckel.
Pylodiscus triangularis, Haeckel.
Spongodiscus favus, Haeckel.
,, *cycloides*, Haeckel.
,, *spongocyclia*, Haeckel.
Spongophacus periphæna, Haeckel.
Stylotrochus arachnius, Haeckel.
,, *craticulatus*, Haeckel.
,, *heteracanthus*, Haeckel.
,, *geddesii*, Haeckel.
Rhopalodictyum abyssorum, Haeckel.
,, *subacutum*, Haeckel.
,, *zittelii*, Haeckel.
Dictyocoryne profunda, Haeckel.
Larcarium axostylum, Haeckel.
Spongolarcus dimensivus, Haeckel.
Larnacidium polybelonium, Haeckel.
Amphipyle callizona, Haeckel.
Amphipylonium spinosissimum, Haeckel.
Tholartus cupula, n.sp. MS.
Larcidium octacanthum, Haeckel.
Larnacantha hexacantha, Haeckel.
Octopyle decastyle, Haeckel.
Pylonium octacanthum, Haeckel.
Amphitholus panicium, Haeckel.
Zoniscus hexatholius, Haeckel.
Spirema diplospira, Haeckel.

Station 225. II. Nassellaria.—Of the Nassellaria, the Plectoidea, Stephoidea, and Botryodea are but sparsely represented, while the Spyroidea and Cyrtoidea are abundant and large; in fact, the individuals belonging to the Spyroidea and Cyrtoidea make up three-fourths of the Nassellaria, and one-half of the total Radiolaria, present in the deposit.

Clathrocircus multiforis, Haeckel.
Zygostephanus reniformis, Haeckel.
Coronidium dyostephanus, Haeckel.
Triplagia horizontalis, Haeckel.
Archicircus ellipsis, Haeckel.
Lithocircus crambessa, Haeckel.
Dendrocircus stalactites, Haeckel.
Semantis dipyla, Haeckel.
Semantiscus hexapylus, Haeckel.
Eucoronis lævigata, Haeckel.
Acrocubus octopylus, Haeckel.
,, *tesseralis*, Haeckel.
Toxarium bifurcum, Haeckel.
Octotympanum arborescens, Haeckel.
Prismatium tripodium, Haeckel.
Tympanidium binoctonum, Haeckel.
Lithotympanum tuberosum, Haeckel.
Eutympanium militare, Haeckel.
Tripospyris conifera, Haeckel.
,, *diomma*, Haeckel.
,, *semantis*, Haeckel.
,, *tribrachiata*, Haeckel.
Triceraspyris corallorrhiza, Haeckel.
,, *giraffa*, Haeckel.
Tristylospyris scaphipes, Haeckel.
,, *ramosa*, Haeckel.
Dipospyris cubus, Haeckel.
,, *forcipata*, Haeckel.
,, *sigmopodium*, Haeckel.
Dendrospyris furcata, Haeckel.
Dorcadospyris antilope, Haeckel.
Elaphrospyris capricornis, Haeckel.
,, *cervicornis*, Haeckel.
Petalospyris eupetala, Haeckel.
Liriospyris heteropoda, Haeckel.
Therospyris leo, Haeckel.
Ceratospyris allmersii, Haeckel.
,, *carnerii*, Haeckel.
,, *strasburgeri*, Haeckel.
Gorgospyris schizopodia, Haeckel.
Dictyospyris mammillaris, Haeckel.
Lophospyris dipodiscus, Haeckel.
Tiarospyris mitra, Haeckel.
,, *pervia*, Haeckel.
Phormospyris tridentata, Haeckel.
Desmospyris cyrtocolpos, Haeckel.
,, *mammillata*, Haeckel.
Tricolospyris kantiana, Haeckel.
,, *leibnitziana*, Haeckel.
,, *newtoniana*, Haeckel.
Nephrospyris cordata, Haeckel.
Perispyris bicincta, Haeckel.
Botryopera multiloba, Haeckel.
Cannobotrys pentacanna, Haeckel.
Botryopyle cephalodes, Haeckel.
,, *sethocorys*, Haeckel.
Botryocampe camerata, Haeckel.
,, *rotalia*, Haeckel.
Lithobotrys sphærothorax, Haeckel.
Pylobotrys fontinalis, Haeckel.
Phormobotrys cannothalamia, Haeckel.
,, *pentathalamia*, Haeckel.
Trissopilium lithomelissa, Haeckel.
Tripilidium ovatum, Haeckel.
Tripodiscium tristylospyris, Haeckel.
Euscenium archicyrtis, Haeckel.
Cladioscenium gladiatum, Haeckel.
,, *pinnatum*, Haeckel.
Pteroscenium spinulosum, Haeckel.
Peridium cervinum, Haeckel.
Bothropyramis quadrata, Haeckel.
Carpocanistrum giganteum, Haeckel.
Cornutella mitra, Haeckel.
Archiscenium callimitra, Haeckel.
Archipera cortiniscus, Haeckel.
Cyrtophormis spiralis, Haeckel.
Cornutanna loxoconus, Haeckel.
Archicorys ampulla, Haeckel.
,, *microstoma*, Haeckel.
Halicapsa hystrix, Haeckel.
Cyrtocalpis gromia, Haeckel.
Dictyophimus bicornis, Haeckel.
,, *brandtii*, Haeckel.
,, *challengeri*, Haeckel.
,, *sphærocephalus*, Haeckel.
,, *triserratus*, Haeckel.
Sethopilium orthopus, Haeckel.
Psilomelissa calvata, Haeckel.

Clathrocanium coarctatum, Haeckel.
„ *sphærocephalum*, Haeckel.
„ *squarrosum*, Haeckel.
Lamprodiscus monoceros, Haeckel.
Clathrocorys teuscheri, Haeckel.
Eucecryphalus gegenbauri, Haeckel.
Lychnocanium lanterna, Haeckel.
„ *tripodium*, Haeckel.
„ *tuberosum*, Haeckel.
„ *ventricosum*, Haeckel.
Lychnodictyum challengeri, Haeckel.
Sethopera tricostata, Haeckel.
Lithopera gutta, Ehrenberg.
Micromelissa bombus, Haeckel.
„ *vespa*, Haeckel.
Peromelissa phalacra, Haeckel.
Tetrahedrina pyriformis, Haeckel.
Sethamphora dodecapleura, Haeckel.
„ *favosa*, Haeckel.
„ *microstoma*, Haeckel.
Sethopyramis quadranta, Haeckel.
Plectopyramis hexapleura, Haeckel.
„ *lagena*, Haeckel.
Anthocyrtis butomus, Haeckel.
Anthocyrtium anthemis, Haeckel.
„ *pyrum*, Haeckel.
Anthocyrtidium cineraria, Haeckel.
Anthocyrtoma alterna, Haeckel.
Carpocanium læve, Haeckel.
„ *palmipes*, Haeckel.
„ *peristomium*, Haeckel.
Clistophæna hexolena, Haeckel.
Sethoconus mitra, Haeckel.
„ *trochus*, Haeckel.
Sethocyrtis diomedis, Haeckel.
Sethocorys ajacis, Haeckel.
„ *odysseus*, Haeckel.
Dictyocephalus ampulla, Haeckel.
Dicolocapsa microcephala, Haeckel.
Córocalyptra agnesæ, Haeckel.
Pterocanium gravidum, Haeckel.
Pterocodon favosus, Haeckel.
Podocyrtis conulus, Haeckel.
„ *costata*, Haeckel.
„ *princeps*, Haeckel.
„ *prismatica*, Haeckel.
Thyrsocyrtis arborescens, Haeckel.
Lithornithium hirundo, Haeckel.
Theopera fusiformis, Haeckel.
Rhopalocanium lasanum, Haeckel.
Rhopalocanium ornatum, Haeckel. Station 225.
Rhopalatractus fusiformis, Haeckel.
Lithochytris pyriformis, Haeckel.
Phormocyrtis costata, Haeckel.
„ *longicornis*, Haeckel.
Alacorys carcinus, Haeckel.
„ *gigas*, Haeckel.
„ *hexacantha*, Haeckel.
„ *lutheri*, Haeckel.
Cycladophora dodecapleura, Haeckel.
„ *favosa*, Haeckel.
„ *pantheon*, Haeckel.
Calocyclas casta, Haeckel.
„ *veneris*, Haeckel.
„ *virginis*, Haeckel.
Theoconus jovis, Haeckel.
„ *orthoconus*, Haeckel.
Lophoconus hexagonalis, Haeckel.
Theocyrtis aspera, Haeckel.
„ *cylindrica*, Haeckel.
„ *paupera*, Haeckel.
Theocorys hyalothorax, Haeckel.
„ *ovata*, Haeckel.
Axocorys macroceros, Haeckel.
Theocampe collaris, Haeckel.
„ *stenostoma*, Haeckel.
Theocapsa aldrovandi, Haeckel.
„ *galeni*, Haeckel.
„ *mülleri*, Haeckel.
„ *schwannii*, Haeckel.
Tricolocapsa decandollei, Haeckel.
Stichopilium costatum, Haeckel.
„ *triserratum*, Haeckel.
Stichocampe divergens, Haeckel.
Artopilium cornutella, Haeckel.
„ *trifenestra*, Haeckel.
Podocampe trictenota, Haeckel.
Cyrtopera gasteroptera, Haeckel.
Artopera fusiformis, Haeckel.
„ *motacilla*, Haeckel.
Stichophormis cornutella, Haeckel.
Phormocampe campanula, Haeckel.
Cyrtophormis aculeata, Haeckel.
„ *corona*, Haeckel.
„ *ovata*, Haeckel.
Artophæna hexapodiscus, Haeckel.
Lithostrobus caloceras, Haeckel.
„ *cornutus*, Haeckel.
„ *monostichus*, Haeckel.
Stichocorys panderi, Haeckel.

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Stichocorys wolfii, Haeckel.
Eucyrtidium hertwigii, Haeckel.
„ *hexagonatum*, Haeckel.
„ *profundissimum*, Ehrenberg.
„ *tricinctum*, Haeckel.
Eusyringium pachysiphon, Haeckel.
Siphocampe quadrantalis, Haeckel.
„ *spiralis*, Haeckel.
„ *tubulosa*, Haeckel.
Lithocampe diploconus, Haeckel.
Lithocampe ovata, Haeckel.
Cyrtocapsa chrysalidium, Haeckel.
„ *costata*, Haeckel.
„ *pyrum*, Haeckel.
„ *tetrapera*, Haeckel.
Stichocapsa monstrosa, Haeckel.
„ *paniscus*, Haeckel.
„ *tetracola*, Haeckel.
Artocapsa armata, Haeckel.
„ *octocamera*, Haeckel.

III. Phæodaria.

Cannopilus diplostaurus, Haeckel.
Challengeron bathybium, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species of Radiolaria are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Siphonosphæra tubulosa, Müller.
Octodendron arboretum, Haeckel.
Axellipsis lobata, Haeckel.
Tessaraspis micropora, Haeckel.
Hexacolpus nivalis, Haeckel.
Diploconus cyathiscus, Haeckel.
Psilomelissa galeata, Haeckel.
Sethoconus trochus, Haeckel.
Sethocyrtis pleuracantha, Haeckel.
Theocampe cryptoprora, Haeckel.
Dictyomitra macilenta, Haeckel.

In addition, the following are recorded in the note-books :—Two species of *Peridinium* (*in catena*), *Pyrocystis*, *Ethmodiscus*, *Coscinodiscus*, and other Diatoms, *Globigerina*, *Orbulina*, *Pulvinulina*, *Tintinnus* and other Infusoria, Medusæ, Siphonophoræ, Echinoderm larvæ, *Sagitta*, *Alciopa*, Aphroditacean, tubicolous, and other Annelid larvæ, Sipunculid (?) larvæ, Planarian larvæ with lateral appendages, *Balanoglossus* larvæ (Tornaria), *Copilia*, *Setella*, *Saphirina*, *Euphausia* larvæ, *Lucifer*, *Sergestes* Zoëæ, small Lamellibranchs and Gasteropods (*Echinospira*), *Atlanta*, *Cardiopoda*, Pteropods, *Appendicularia*, *Doliolum*, *Salpa*. Several sharks were seen, and one was caught ; it was a male, about five feet in length, and had on it *Caligus* and another genus of parasites.

Station 226.

Station 226 (Sounding 364), Admiralty Islands to Yokohama (see Chart 31 and Diagram 16).

March 25, 1875 ; lat. 14° 44′ N., long. 142° 13′ E.
Temperature of air at noon, 79°·3 ; mean for the day, 78°·9.

Station 226.

Temperature of water :—

	°		°
Surface,	79·0	180 fathoms,	54·5
10 fathoms,	78·9	190 „	53·5
20 „	78·8	200 „	52·8
30 „	78·7	300 „	45·1
40 „	78·6	400 „	41·8
50 „	78·5	500 „	39·9
60 „	77·9	600 „	38·7
70 „	77·0	700 „	37·7
80 „	75·7	800 „	36·9
90 „	73·8	900 „	36·3
100 „	71·3	1000 „	36·0
110 „	68·0	1100 „	35·7
120 „	64·6	1200 „	35·5
130 „	62·1	1300 „	35·5
140 „	60·2	1400 „	35·5
150 „	58·3	1500 „	35·5
160 „	56·8	Bottom,	35·5
170 „	55·6		

Density at 60° F. :—

Surface,	1·02595	200 fathoms,	1·02556
25 fathoms,	1·02570	300 „	1·02539
50 „	1·02580	400 „	1·02539
100 „	1·02599		

Depth, 2300 fathoms ; deposit, Red Clay, containing 6·11 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4 A.M. got up steam. At 5.45 A.M. shortened and furled sails, and proceeded under steam to sound. At 6.30 A.M. sounded in 2300 fathoms. At 8 A.M. put trawl over, veering 3000 fathoms. At 10.30 A.M. obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 200 fathoms, and amounted to 33·8 milligrammes per litre. At 1 P.M. commenced heaving in trawl, which came up at 3.20 P.M. with only a few pumice-stones, fragments of *Brisinga*, and two small fishes. Made sail and proceeded. Boobies, noddies, and boatswain birds were seen from the ship.

Distance at noon from No Sima lighthouse, 1220 miles. Made good 99 miles. Amount of current 13 miles, direction S. 77° W.

Animals from Trawl.

The following species are recorded from the trawl at this Station :—

Asteroidea (Sladen, Zool. pt. 51).

Freyella attenuata, n.sp. Fragments ; obtained at no other locality.

Fishes (Günther, Zool. pt. 57).

Gonostoma microdon, n.sp. One specimen ; for distribution see Station 23.

Another small transparent fish recorded in the Station-book.

Station 226. Organisms from Surface-Nets.

Surface Organisms.—The following are recorded in the note-books from the surface at this Station:—*Pyrocystis*, Diatoms, *Peridinium* (*Ceratium*) *tripos* and another species (*in catena*), Oscillatoriaceæ, *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina*, many varieties of Radiolaria, Medusæ, several varieties of Siphonophoræ, Echinoderm larvæ, *Sagitta*, *Alciopa*, tubicolous and other small Annelids, *Cypridina* (three species), *Copilia*, *Setella*, *Saphirina*, Phronimids, Hyperids, *Squilla* larvæ, *Euphausia*, *Lucifer*, *Phyllosoma*, *Amphion*, portion of antenna of a deep-sea shrimp, *Halobates*, small Lamellibranchs and Gasteropods, *Phylliroë*, *Atlanta*, *Spongiobranchæa* and other Pteropods, Cymbulian larvæ, *Doliolum*, *Salpa*, small *Pyrosoma* (from trawl), small fishes. Many flying fishes (*Exocoetus*) and a shark were seen; a tow-net was carried away by a shark.

About a dozen each of *Pyrocystis noctiluca* and *Pyrocystis fusiformis* were carefully separated from other things and placed in two globes, each globe containing only the same variety, and after dark were examined for phosphorescence. When the water was disturbed several very brilliant spots of light appeared in both globes, and no difference in the nature or intensity of the light could be detected. They lost their light more or less after being disturbed several times in succession, but when allowed to rest for an hour or so they were again as bright as at first.

Station 227.

Station 227 (Sounding 365), Admiralty Islands to Yokohama (see Chart 31 and Diagram 16).

March 27, 1875; lat. 17° 29′ N., long. 141° 21′ E.

Temperature of air at noon, 79°·5; mean for the day, 78°·5.

Temperature of water:—

	°		°
Surface, ...	79·2	180 fathoms, . . .	60·4
10 fathoms, . . .	79·0	190 „ . . .	58·8
20 „ . . .	78·8	200 „ . . .	57·0
30 „ . . .	78·6	300 „ . . .	46·2
40 „ . . .	78·4	400 „ . . .	42·0
50 „ . . .	78·2	500 „ . . .	40·3
60 „ . . .	78·0	600 „ . . .	39·0
70 „ . . .	77·6	700 „ . . .	38·3
80 „ . . .	76·5	800 „ . . .	37·8
90 „ . . .	75·0	900 „ . . .	37·3
100 „ . . .	73·3	1000 „ . . .	36·8
110 „ . . .	71·5	1100 „ . . .	36·3
120 „ . . .	70·0	1200 „ . . .	35·9
130 „ . . .	68·3	1300 „ . . .	35·5
140 „ . . .	66·7	1400 „ . . .	35·2
150 „ . . .	65·2	1500 „ . . .	35·2
160 „ . . .	63·5	Bottom, . . .	35·2
170 „ . . .	62·0		

Density at 60° F. :— Station 227.

Surface,	1·02572	200 fathoms,	1·02591
25 fathoms,	1·02574	300 „	1·02536
50 „	1·02575	400 „	1·02550
100 „	1·02605		

Depth, 2475 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4 A.M. got up steam. At 5.30 A.M. shortened and furled sails, and proceeded under steam to sound. At 6.30 A.M. sounded in 2475 fathoms. Took serial temperatures down to 1500 fathoms. At 10 A.M. completed observations and made sail. Albatrosses, boatswain birds, and what seemed to be a noddy tern were seen about the ship.

No Sima lighthouse distant at noon, 1040 miles; Lindsay Islands, 105 miles. Made good 77 miles. Amount of current 23 miles, direction N. 48° W.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station :— Organisms from Surface-Nets.

Amphipoda (Stebbing, Zool. pt. 67).
Phronima megalodous, n.sp.

Macrura (Spence Bate, Zool. pt. 52).
Eretmocaris longicaulis, n.g., n.sp.

Nudibranchiata (Bergh, Zool. pt. 26).
Acura lanceolata, Bergh.

In addition, the following are recorded in the note-books :—Oscillatoriaceæ, *Pyrocystis* (two species), *Ethmodiscus* and other Diatoms, *Peridinium tripos* and two other species, Gregarinids (*Gregarina clavata* ?), *Globigerina*, *Orbulina*, *Pulvinulina*, Radiolaria in great numbers, Medusæ, Siphonophoræ, *Beroë*, Echinoderm larvæ, *Sagitta*, *Alciopa*, Sipunculid and Echiurid larvæ, *Cypridina* (several species), *Setella*, *Copilia*, Calanids, Hyperids, *Oxycephalus*, *Squilla* larvæ, *Euphausia*, *Siriella*, *Sergestes* and larvæ, *Lucifer*, *Amphion*, *Phyllosoma*, small Anomurous crab, Zoëæ of crab, *Halobates*, small Lamellibranchs and Gasteropods, *Atlanta*, *Pterotrachea*, *Hyalæa* [= *Cavolinia*], *Styliola*, small *Octopus*, *Fritillaria*, *Doliolum*, *Salpa*, small Percoid fishes. Coccoliths and Rhabdoliths were found in the stomachs of the *Salpæ*. About a dozen of the large cylindrical Diatoms (*Ethmodiscus*) were separated into a globe of water, and after dark disturbed for phosphorescence, but they showed no light. *Coryphæna* and another large fish of a dark colour, with the dorsal and anal fins opposite each other on the hinder part of the body, as well as a shoal of small fishes, were seen about the ship. In this connection it may be noted that no sharks were seen, and it was observed that other fishes were seldom seen when sharks were about.

Station 228.

Station 228 (Sounding 366), Admiralty Islands to Yokohama (see Chart 31 and Diagram 16).

March 29, 1875 ; lat. 19° 24′ N., long. 141° 13′ E.
Temperature of air at noon, 81°·3 ; mean for the day, 79°·3.
Temperature of water :—

Surface,	80°·2	400 fathoms,	42°·6
25 fathoms,	79·0	500 „	40·1
50 „	77·4	600 „	38·9
75 „	75·0	700 „	38·0
100 „	71·5	800 „	37·4
125 „	68·3	900 „	36·9
150 „	64·8	1000 „	36·4
175 „	61·3	1100 „	35·9
200 „	58·0	1200 „	35·4
225 „	55·2	1300 „	35·3
250 „	52·4	1400 „	35·2
275 „	49·8	1500 „	35·2
300 „	47·7	Bottom,	35·2

Density at 60° F. :—

Surface,	1·02582	200 fathoms,	1·02566
25 fathoms,	1·02586	300 „	1·02542
50 „	1·02592	400 „	1·02530
100 „	1·02584		

Depth, 2450 fathoms ; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5.20 A.M. got up steam. At 6 A.M. proceeded under steam. At 8 A.M. shortened and furled sails. At 9 A.M. sounded in 2450 fathoms. At noon obtained serial temperatures down to 1500 fathoms. Although the ship seemed to have actually passed over the supposed position of Lindsay Islands, as laid down in the charts (position marked as doubtful), no land was visible. At 1.45 P.M. completed temperature observations and made sail. Black and white terns and boatswain birds were observed.

Distance at noon from No Sima lighthouse, 932 miles. Made good 61 miles. Amount of current 17 miles, direction N. 17° W.

Organisms from Surface-Nets.

Surface Organisms.—The following are recorded in the note-books (March 29 to 31) :—Oscillatoriaceæ, *Peridinium* (three species), many specimens of *Pyrocystis* (two species), Diatoms, Rhabdospheres, Coccospheres, *Gregarina*, *Globigerina*, *Hastigerina* abundant, *Pulvinulina*, Radiolaria abundant (especially *Aulosphæra*), *Tintinnus* and other Infusoria, Medusæ, Siphonophoræ (many forms), oval red Cœlenterate larvæ with

golden band round it (like Semper's Cœlenterate larva), *Beroë*, Echinoderm larvæ, *Sagitta*, *Alciopa*, Sipunculid and Echiurid larvæ, *Cypridina* (three or four species), *Pontella*, *Copilia*, *Calanus*, *Setella*, *Saphirina*, Hyperids, *Oxycephalus*, *Erichthus*, *Euphausia*, *Regulus lucidus*, Dana, *Lucifer*, *Sergestes* and larvæ, *Phyllosoma*, Zoëæ, *Halobates*, small Lamellibranchs and Gasteropods, *Atlanta*, *Cardiopoda*, *Firoloida*, Pteropods and larvæ in great variety, small Cephalopods, *Appendicularia*, *Doliolum*, *Salpa*, small fishes. A female shark (*Carcharias*) was caught; it had the remains of a noddy tern in its stomach. What appeared to be a true *Amœba* was observed, but it may have escaped from some of the animals on the slide. *Hastigerina* became abundant, while the other Foraminifera became less numerous; it was always of a red colour and always had spines, along which it threw out its pseudopodia, attaching itself to the glass globe by other pseudopodia; it had no yellow cells (zooxanthellæ) like *Orbulina* and *Globigerina*. The red sarcode mass of *Aulosphæra* was often separated from the skeleton, and was found in the globe among the other things without reticulated sphere. Some of the specimens of *Halobates* lived for a long time in a glass globe, diving frequently and carrying with them a bubble of air. Station 228.

The following species are recorded from the surface in this part of the Pacific, in February and March 1875, the exact date not being noted:—

Amphipoda (Stebbing, Zool. pt. 67).

Phronimella elongata, Claus.

Schizopoda (Sars, Zool. pt. 37).

Nematoscelis rostrata, n.g., n.sp.
Siriella gracilis, Dana.

Macrura (Spence Bate, Zool. pt. 52).

Sergestes corniculum, Krøyer.
,, *læviventralis*, n.sp.
Sciacaris telsonis, n.g., n.sp.
Amphion sp. (?), (Zoëæ).

Pelagic Hemiptera (White, Zool. pt. 19).

Halobates wüllerstorffi, Frauenfeld.
,, *germanus*, n.sp.

Nudibranchiata (Bergh, Zool. pt. 26).

Glaucilla briareus (Reinhardt).

Tunicata (Herdman, Zool. pt. 76).

Pyrosoma sp. (?).
Salpa runcinata-fusiformis, Chamisso—Cuvier.

Station 229 (Sounding 367), Admiralty Islands to Yokohama (see Chart 31, and Diagrams 14 and 16). Station 229.

April 1, 1875; lat. 22° 1′ N., long. 140° 27′ E.
Temperature of air at noon, 79°·8; mean for the day, 77°·3.

Station 229.

Temperature of water :—

	°		°
Surface,	78·5	400 fathoms,	44·2
25 fathoms.	75·7	500 „	40·3
50 „	73·3	600 „	38·5
75 „	71·0	700 „	37·7
100 „	69·0	800 „	37·2
125 „	66·9	900 „	36·7
150 „	64·8	1000 „	36·3
175 „	62·5	1100 „	35·8
200 „	60·4	1200 „	35·3
225 „	58·3	1300 „	35·2
250 „	56·2	1400 „	35·2
275 „	54·1	1500 „	35·2
300 „	52·0	Bottom,	35·2

Density at 60° F. :—

Surface,	1·02613	200 fathoms,	1·20555
25 fathoms,	1·02590	300 „	1·02507
50 „	1·02594	400 „	1·02528
100 „	1·02580		

Depth, 2500 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 3.15 A.M. shortened and furled sails, and got up steam. At 5.15 A.M. stopped, and at 6 A.M. sounded in 2500 fathoms. At 7 A.M. put over trawl. At 10 A.M. obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 300 fathoms, and amounted to 34·0 milligrammes per litre. At 2 P.M. commenced heaving in trawl, but at 5.30 P.M. the weights only came up, the rope having parted just below the weights, and the trawl and 500 fathoms of rope were lost. Lord Campbell shot on the wing an albatross (*Diomedea brachyura*), and other albatrosses, petrels, prions, boatswain birds, and phaleropes were seen.

Distance at noon from No Sima lighthouse, 772 miles. Made good 44 miles. Amount of current 4 miles, direction N. 45° W.

Diatomaceæ.—The following species of Diatoms were observed by Mr. Rattray and Mr. Comber in the deposit from this Station :—

Navicula multicostata, Grunow.
major, Kutzing (fresh water).
radiosa, Kutzing (fresh water).
Nitzschia marina, Grunow.
„ *scalaris*, W. Smith.
Triceratium seychellense, Grunow.
Hemidiscus cuneiformis, Wallich.
Cerataulus turgidus, Ehrenberg.
Coscinodiscus leptopus, Janisch.
„ *anguste-lineatus*, A. Schmidt.
„ *excentricus*, Ehrenberg.
„ *denarius*, A. Schmidt.

Station 229.

Coscinodiscus curvatulus, Grunow.
,, ,, var. *recta*, Rattray.
,, *radiatus*, Ehrenberg.
,, ,, var. *media*, Grunow.
,, *nodulifer*, A. Schmidt.
,, *obscurus*, A. Schmidt.
,, *africanus*, Janisch.
,, *concinnus*, Smith.
,, *rex*, Wallich.
,, *centralis*, Ehrenberg.
,, *marginatus*, Ehrenberg.
,, *normanii*, Gregory.
,, *polyacanthus*, Grunow (?).
Coscinodiscus dubiosus, Grunow.
,, *gazellæ*, Janisch.
Ethmodiscus sp. (?).
Actinocyclus punctulatus, Castracane.
,, sp. (near *subtilis*).
Asteromphalus arachne, Ralfs.
,, *roperianus*, Ralfs.
Asteromphalus humboldtii, Ehrenberg.
,, *hiltonianus*, Ralfs.
Stoschia admirabilis, Janisch.
Asterolampra marylandica, Ehrenberg.
Melosira sp. (?).
Surirella robusta, Ehrenberg (fresh water), var.
Fragilaria pacifica, Grunow.
,, *nitzschioides*, Grunow, var. *brasiliensis*, Rattray, MS.
Achnanthes subsessilis, Ehrenberg.
Cymbella (*Cocconema*) *cistula*, Hempricht (fresh water).
Synedra capitata, Ehrenberg (fresh water).
,, *gaillionii*, Ehrenberg.
Epithemia turgida, Kutzing, var. *granulata*, Cleve (fresh water).
,, ,, forma *minor*.
,, *gibba*, Kutzing, var. *ventricosa*, Cleve (fresh water).
Pleurosigma decorum, W. Smith.
Gomphonema geminatum, Agardh (fresh water).

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface in the neighbourhood of this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.

Siphonophoræ (Haeckel, Zool. pt. 77).

Velella oblonga, Chamisso.

Amphipoda (Stebbing, Zool. pt. 67).

Synopia schéeleana, Bovallius.
Vibilia propinqua, n.sp.
Phrosina pacifica, n.sp.
Anchylomera sp. (?).
Phorcorrhaphis edwardsi, n.sp.
Platyscelus armatus (Claus).
Eupronoë sp. (?).
Brachyscelus crusculum, Spence Bate.

Cephalopoda (Hoyle, Zool. pt. 44).

Octopus brevipes, d'Orbigny.
Teleoteuthis caribbæa (Lesueur), Verrill (?).

Tunicata (Herdman, Zool. pt. 76).

Doliolum affine, n.sp.

In addition, the following are recorded in the note-books (April 1 to 4) :— Oscillatoriaceæ, *Peridinium*, *Pyrocystis*, *Ethmodiscus* and other Diatoms (the smaller species of Diatoms more abundant than in any of the recent Stations to the south), *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina*, *Calcaromma calcarea* and other Radiolaria in great numbers, Tintinnidæ and other Infusoria, Medusæ, *Diphyes*, *Porpita*, Ctenophoræ (*Cydippe* or *Pleurobrachia*), *Sagitta*, *Alciopa*, *Tomopteris*, Sipunculid larvæ, *Cypridina*, Copepods, *Oxycephalus*, *Phronima*, *Phronimella*, Hyperids, *Dithyrus*, *Erichthus*, *Alima*, *Euphausia pellucida*, *Siriella*, *Amphion*, *Phyllosoma*, *Lucifer*,

Station 229. *Sergestes*, crab, Zoëæ, *Halobates*, *Ianthina*, small shells, *Glaucus*, *Atlanta*, *Cardiopoda*, *Carinaria*, *Pneumonoderma*, *Eurybia* [= *Halopsyche*], *Hyalæa* [= *Cavolinia*], *Styliola*, *Cleodora* [= *Clio*] *balantium*, *Appendicularia*, *Salpa*, *Pyrosoma*, several fishes (large Stomiatidæ and Scopelids four inches in length). A shark was caught, a female *Carcharias*, six feet in length, with the tips of the fins white.

Willemoes-Suhm writes: "The tow-net brought in some very fine things. *Salpæ* and Medusæ filled the water, along with very large Collosphæridæ. There were also Ctenophoræ, huge specimens of *Alciopa* with intense black spots, small *Tomopteris*, Crustacea in great abundance, especially Copepods, and Amphipods belonging to the genera *Anchylomera* and *Hyperia*, and also *Dithyrus*, the coxæ of the pereiopods of which are so singularly enlarged as to form a ventral cavity with the abdomen, and closes up the animal entirely. *Phyllosoma* was very common in all stages, and will furnish very valuable material for working out the development of the Pacific Loricata. The specimens of *Halobates* were constantly smaller than the Atlantic specimens. There were many small fishes, including Stomiatidæ with phosphorescent lateral spots, some over two inches in length. *Velella*, which has seldom been taken, made its appearance, along with its parasite *Ianthina*, and *Porpita* and *Glaucus*. Among the Pteropods I found several specimens of *Cleodora balantium* with the animals—a Mollusc we have never taken alive before, and is, I believe, considered to be very rare."

Station 230. **Station 230** (Sounding 368), Admiralty Islands to Yokohama (see Chart 31 and Diagram 16).

April 5, 1875; lat. 26° 29′ N., long. 137° 57′ E.
Temperature of air at noon, 73°·3; mean for the day, 70°·5
Temperature of water:—

	°		°
Surface,	68·5	400 fathoms,	43·0
25 fathoms,	67·0	500 „	39·7
50 „	66·0	600 „	38·0
75 „	65·0	700 „	37·2
100 „	63·9	800 „	36·7
125 „	62·8	900 „	36·3
150 „	61·7	1000 „	35·9
175 „	60·7	1100 „	35·5
200 „	59·7	1200 „	35·5
225 „	58·2	1300 „	35·5
250 „	56·0	1400 „	35·5
275 „	53·3	1500 „	35·5
300 „	50·5	Bottom,	35·5

Density at 60° F. :— STATION 230.

Surface,	1·02606	200 fathoms,	1·02561
25 fathoms,	1·02582	300 ,,	1·02551
50 ,,	1·02579	400 ,,	1·02509
100 ,,	1·02583		

Depth, 2425 fathoms; deposit, Red Clay, containing no carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 3.15 A.M. shortened and furled sails, and got up steam. At 5.15 A.M. stopped, and at 6 A.M. sounded in 2425 fathoms; the tube brought up a considerable quantity of Red Clay. At 8 A.M. put over trawl. At 10 A.M. obtained serial temperatures down to 1500 fathoms. In the forenoon sent whaler away to collect surface animals. Sent down two pressure gauges, water-bottle, and a series of small wooden blocks of different kinds of wood to test the effect of pressure at great depths. The carbonic acid was determined in water from 50 fathoms, and amounted to 32·8 milligrammes per litre. At 4.45 P.M. hove up trawl with only a few pumice-stones, some shrimps, two fishes, and a Brachiopod on one of the pumice-stones. Made sail. Several sooty albatrosses were seen, and one was taken with hook and line, also a few white albatrosses, black prions, light-coloured prions, black and white petrels. A booby (*Sula fusca*) alighted on one of the quarter boats and was caught. On the 7th a flock of swallows (*Hirundo gutturalis*) alighted on the ropes and ports of the ship in an exhausted condition, and four or five were caught by the hand; their stomachs were well filled with insect remains. A thrush-like bird and several finches were also seen.

Distance at noon from No Sima lighthouse, 514 miles; from Redfield Rocks, 448 miles. Made good 56 miles. Amount of current 4 miles, direction W.

The following species are recorded in the Zoological Reports from the trawl at this Station :— ANIMALS FROM TRAWL.

MACRURA (Spence Bate, Zool. pt. 52).

Gennadas parvus, n.g., n.sp. One specimen; for distribution see Station 45.

Acanthephyra sica, n.sp. Two specimens; for distribution see Station 40.

Tropiocaris planipes, n.g., n.sp. One specimen; obtained at no other locality. The only other species of the genus (*Tropiocaris tenuipes*) was taken at Station 184.

FISHES (Günther, Zool. pt. 57).

Gonostoma gracile, n.sp. One specimen; obtained also at Station 232, 345 fathoms.

In addition to the foregoing, the Station-book records a Brachiopod on pumice-stone, and another Sternoptychid fish, $2\frac{1}{2}$ inches in length.

Station 230. Organisms from the Deposit.

Diatomaceæ.—The following species of Diatoms were observed by Mr. Rattray in the deposit from this Station :—

Coscinodiscus rex, Wallich.
„ *curvatulus*, Grunow, var. *genuina*, Grunow.
„ *radiatus*, Ehrenberg, var. *media*, Grunow.
„ *excentricus*, Ehrenberg.
„ *leptopus*, Grunow.
„ *gazellæ*, Janisch.
„ *centralis*, Ehrenberg.
„ *marginatus*, Ehrenberg.
„ *lineatus*, Ehrenberg.
„ *africanus*, Janisch.
„ *apiculatus*, Ehrenberg, var. *ambigua*, Grunow.
Coscinodiscus nodulifer, Janisch.
„ *gigas*, Ehrenberg, var. *diorama*, Grunow.
Stoschia admirabilis, Janisch.
Asterolampra marylandica, Ehrenberg.
Asteromphalus stellatus, Ralfs.
„ *roperianus*, Ralfs.
„ *hiltonianus*, Ralfs.
Hemidiscus cuneiformis, Wallich.
Navicula spectabilis, Gregory, var.
Nitzschia scalaris, W. Smith, var.
Alloioneis antillarum, Cleve and Grunow.
Synedra affinis, Kutzing, var. approaching *hybrida*,
Gomphonema geminatum, Agardh (fresh water).

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface in the neighbourhood of this Station :—

Copepoda (Brady, Zool. pt. 23).—Parasitic on shark.

Pandarus cranchii (Leach), Steenstrup and Lütken.
Nogagus latreillii (Leach), Steenstrup and Lütken.
„ *curticaudis* (Dana).
„ *validus*, Dana.

Amphipoda (Stebbing, Zool. pt. 67).

Orchomene musculosus, n.sp.
Phronimella elongata, Claus.
Phrosina pacifica, n.sp.
Anchylomera blossevillii, M.-Edwards.
„ sp. (?).
Eupronoë inscripta, n.sp.
Brachyscelus sp. (?).

Macrura (Spence Bate, Zool. pt. 52).

Elaphocaris crassus (Suhm, MS.), n.sp.

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *virgula* (Rang).
„ (*Hyalocylix*) *striata* (Rang).
Clio (*Styliola*) *subula*, Quoy and Gaimard.
„ *pyramidata*, Linné.
„ *cuspidata* (Bosc).
Cuvierina columnella (Rang).
Cavolinia trispinosa (Lesueur).
„ *longirostris* (Lesueur).
„ *gibbosa* (Rang).
„ *inflexa* (Lesueur).

Cephalopoda (Hoyle, Zool. pt. 44).

Teleoteuthis caribbæa (Lesueur), Verrill (?).

Tunicata (Herdman, Zool. pt. 76).

Pyrosoma elegans, Lesueur (?).
Salpa costata-tilesii, Quoy and Gaimard—Cuvier.
„ *cordiformis-zonaria*, Quoy and Gaimard—Pallas.
„ *cylindrica*, Cuvier (?).

Fishes (Günther, Zool. pt. 78).

Carcharias glaucus, Linné.

In addition, the following are recorded in the note-books (April 5 to 8):— Oscillatoriaceæ, *Noctiluca*, *Ethmodiscus*, *Coscinodiscus*, many small Diatoms in chains, *Vorticella* on *Bacteriastrum*, *Peridinium* (two species), *Pyrocystis* (two varieties), *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina*, Acanthometræ, Polycystinæ (some very fine specimens from tow-net sent down to 400 fathoms), Collosphæridæ, Medusæ, *Velella*, *Porpita*, Ctenophoræ, Echinoderm larvæ, *Sagitta*, *Alciopa*, *Tomopteris*, Sipunculid and other larvæ, curious Annelid (from tow-net sent down to 400 fathoms), *Cypridina* (several species), *Calanus*, *Saphirina*, and other Copepods, Hyperids, *Phronima*, *Oxycephalus*, *Euphausia* and larvæ, *Lucifer*, *Phyllosoma*, *Sergestes* larvæ, small crab, small Lamellibranchs, *Ethella*, *Atlanta*, *Carinaria*, Pteropod larvæ, *Appendicularia* (two varieties), *Doliolum*, larval *Amphioxus* and Scopelids with phosphorescent spots. A male shark (*Carcharias glaucus*), eight feet in length, was caught; it had four pilot fish about it. Mr Murray was away in a boat examining the surface with a water-glass. The water was very clear; only Oscillatoriaceæ, small Crustacea, Radiolaria, and long strings of Diatoms could be observed. Whales were seen spouting near the ship on the evening of the 6th. The presence of *Noctiluca*, larval *Amphioxus*, Echinoderm and Annelid larvæ, numerous small Diatoms, and Infusoria, indicated the presence of brackish water, probably carried from the coast of Asia by the Japan current.

STATION 230.

Station 231 (Sounding 369), Admiralty Islands to Yokohama (see Chart 31 and Diagram 16).

STATION 231.

April 9, 1875; lat. 31° 8′ N., long. 137° 8′ E.

Temperature of air at noon, 65°·3; mean for the day, 64°·7.

Temperature of water:—

Surface,	64·0	250 fathoms,	43·0
10 fathoms,	63·2	275 „	41·8
20 „	62·4	300 „	40·7
30 „	61·6	400 „	38·2
40 „	60·8	500 „	37·3
50 „	59·9	600 „	37·0
60 „	59·1	700 „	36·7
70 „	58·3	800 „	36·4
80 „	57·5	900 „	36·2
90 „	56·6	1000 „	36·0
100 „	55·8	1100 „	35·8
125 „	53·4	1200 „	35·6
150 „	51·2	1300 „	35·4
175 „	49·2	1400 „	35·2
200 „	47·0	1500 „	35·2
225 „	45·0	Bottom,	35·2

Station 231.

Density at 60° F.:—

Surface,	1·02541	200 fathoms,	1·02546
25 fathoms,	1·02566	300 „	1·02544
50 „	1·02562	400 „	1·02549
100 „	1·02650	Bottom,	1·02579

Depth, 2250 fathoms; deposit, Blue Mud, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4 A.M. got up steam. At 5.30 A.M. shortened and furled sails. At 6 A.M. proceeded under steam, and at 6.15 A.M. sounded in 2250 fathoms. At 8 A.M. obtained serial temperatures down to 1500 fathoms. At 11.30 A.M. completed observations, and made all plain sail. Black and white albatrosses were seen.

Distance at noon from Redfield Rocks, 189 miles. Made good 70 miles. Amount of current 7 miles, direction S.

Organisms from the Deposit.

Radiolaria (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station :—

Distephanus corona, Haeckel.
Aulographis taumorpha, Haeckel.
„ *furcula*, Haeckel.
Aulospathis diodon, Haeckel.
Challengeria sigmodon, Haeckel.
Challengeria harstoni, Murray.
„ *murrayi*, Haeckel.
Challengeron channeri, Murray.
„ *ciliatum*, Haeckel.
Haeckeliana goetheana, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Staurotholus polystylus, Haeckel.
Staurotholoniumoctodoratium, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Auloceros furcosus, Haeckel.
Sagoplegma pyramidophora, Haeckel.
Aulosphæra triodon, Haeckel.
Auloscena tentorium, Haeckel.
Auloplegma spongiosum, Haeckel.
Medusetta quadrigata, Haeckel.
Castanissa crosbiei, Haeckel.

In addition, the following are recorded in the note-books (April 9, 10) :—Diatoms, *Noctiluca*, *Pyrocystis* (two varieties), *Peridinium* (two species) *in catena*, *Acineta* (on tails of Copepods), *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina*, Challengeridæ (from tow-net sent down to 1000 fathoms), Medusæ, Diphyids, *Velella*, Ctenophoræ, small Ophiurid (from net sent down to 1000 fathoms), *Sagitta*, *Tomopteris*-like Annelid, Annelid and Planarian larvæ, *Cythere*, *Cypridina* (several species), *Saphirina* and other Copepods, *Rhabdosoma*, *Phronima*, *Phornimella*, *Anchylomera*, Hyperids, *Oxycephalus*,

SOUNDINGS AND STATIONS
in the vicinity of
JAPAN
For explanation of abbreviations &c. see Appendix I

134° 135° 136° 137° 138° 139° 140° 141°
36° 35° 34° 33°

Miako
Lake Biwa
Owari Bay
Matoya Hd
C. Sima
Osima Hd
Suno misaki
Muroto Saki
Kii Channel
Kobe
Osaka
Sumi sima
Awaji Sima
Idzumi Nada
Harima Nada
Bingo Nada
Iwo sima
Fusi-yama 12365'
Yedo
Yokohama
Inaboye saki
Kawarasu
Vries I
Rock I°
To-sima
Utorie
Nii sima
Koeu-sima
Miaki
Mikura
Kanawa
Fatsizio
Redfield Rk I.

345 (232) green mud
(234) 775 (236) 420 green mud
(237) (875) blue mud
(235) 565 green mud
(234) 2675 blue mud
50 (238) 8 blue mud

One mile per hour May 1875.
One mile per hour May 1875.
One mile per hour May 1875.
One mile per hour June 1875.
Current experienced here in June 1875 by Challenger.

134° 135° 136° Long. East from Greenwich 137° 138° 139° 140° 141°

Engraved by Malley & Sons

Euphausia pellucida with eggs and Nauplii, *Siriella*, *Lucifer*, *Phyllosoma*, *Sergestes* and larvæ, Brachyurous Zoëæ, *Cleodora* [= *Clio*], *Cuvierina*, *Hyalæa* [= *Cavolinia*], *Styliola*, small Cephalopod with ten arms (over an inch in length), *Appendicularia*, *Fritillaria*, *Doliolum*, *Salpa* (with Coccospheres, &c., in the stomach), *Leptocephalus*, Stomiatidæ. The tow-nets from the surface were filled with Diatoms and *Noctilucæ*, making the water quite thick when placed in the globes, whereas two tow-nets sent down to 900 and 1000 fathoms contained fewer *Noctilucæ* and Diatoms, and the water in the globes remained clear. Sometimes the ship appeared to be passing through patches of greenish water, in which *Noctiluca*, numerous Diatoms, and larval forms indicating brackish water were rather abundant, but these were quite absent from the surrounding deep blue water. STATION 231.

The following species are recorded in the Zoological Reports from the surface in the North-West and West Pacific and between New Guinea and Japan, the exact date not being noted:—

AMPHIPODA (Stebbing, Zool. pt. 67).

Paraphronima cuivis, n.sp.
Phronima sp. (?).
Anchylomera sp. (?).

MACRURA (Spence Bate, Zool. pt. 52).

Acanthosoma brevitelsonis, n.sp.
,, *tynitelsonis*, n.sp.
,, *dorsispinalis*, n.sp.
Mastigopus acetiformis, n.sp.
,, *spiniventralis*, n.sp.
Sergestes corniculum, Krøyer.
,, *semiarmis*, n.sp.
Lucifer typus, Thompson.
,, *reynaudii*, M.-Edwards.
Eretmocaris remipes, n.g., n.sp.
Amphion sp. (?), (larvæ).

PELAGIC HEMIPTERA (White, Zool. pt. 19).

Halobates sericeus, Eschscholtz.
,, *germanus*, n.sp.

CEPHALOPODA (Hoyle, Zool. pt. 44).

Tremoctopus gracilis (Eydoux and Souleyet), Tryon (?).

TUNICATA (Herdman, Zool. pt. 76).

Cyclosalpa pinnata (Forskål).

FISHES (Günther, Zool. pt. 78).

Holocentrum sp. (?).
Histiophorus sp. (?).
Lirus paucidens, n.sp.
Psenes cyanophrys, C.V.
Thynnus thunnina (C.V.), (young).
Lophotes cepedianus, Giorna, (young).
Young Pleuronectid (*Synaptura* ?).
Scopelus coccoi (Cocco).
,, *nigro-ocellatus* (Günther).

The Challenger anchored off Yokohama at 5 P.M. on April 11, 1875, remaining there till 2.30 P.M. on May 11, when she sailed for the Inland Sea, anchoring near the entrance AT JAPAN.

At Japan. to Yeddo Bay the same evening. May 12 was spent in dredging and trawling on the "*Hyalonema*-ground" (Station 232); the ship, proceeding thence under steam, anchored in Oosima Harbour at 2.30 P.M. on the 14th, leaving early on the 15th, and anchoring off Kobé about 5 P.M. the same day. On May 17 and 19, the steam pinnace went out dredging in the bay (Stations 233 and 233A). At 10 A.M. on May 25, the ship proceeded to the Inland Sea, anchoring in the evening at 6.30 P.M. At 6 A.M. on May 26, the ship proceeded towards Miwara, dredging and trawling in 15 fathoms (Station 233B), anchoring off Miwara about 4 P.M., and remaining there till 9 A.M. on May 28, when the expedition returned to Kobé, trawlings being taken in 12 fathoms (Station 233C) on the way, and Kobé was reached at 4.30 P.M. on May 29. The ship left Kobé at 10 A.M. on June 2 for Yokohama, proceeding out into the Japan Stream, and on the 3rd sounded in 2675 fathoms (Station 234), on the 4th sounded and trawled in 565 fathoms (Station 235), and on the 5th sounded and trawled in 775 to 420 fathoms (Stations 236 and 236A), reaching Yokohama about 10 P.M. the same day, and remaining there till 3 P.M. on June 16 (for description of Japan and the various places visited see *Narr. Chall. Exp.*, vol. i. pp. 744–750).

Station 232. **Station 232** (Sounding 370), off Japan (see Chart 35).

May 12, 1875; lat. 35° 11′ N., long. 139° 28′ E.
Temperature of air at noon, 64°·3; mean for the day, 61°·4.
Temperature of water :—

Surface,	64·2	150 fathoms,	50·0
25 fathoms,	62·8	175 „	48·7
50 „	58·8	200 „	47·4
75 „	55·4	225 „	46·1
100 „	53·0	250 „	45·0
125 „	51·4	Bottom,	41·1

Density at 60° F. at surface, 1·02539.
Depth, 345 fathoms; deposit, Green Mud, containing 3·29 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. got up steam. At 5.15 A.M. weighed anchor and proceeded out of Kaneda Bay. Rounded Tsuruga Saki and Joka Sima, and steered for dredging ground off Ino Sima Island in Kama Kura Bay. At 9 A.M. stopped and sounded in 345 fathoms. Put dredge over. At 11.30 A.M. hove up dredge with several specimens. Sent whaler to communicate with fishing-boats, which were fishing in the same depth of water, from whom Mr. Murray obtained some of the fishes and other animals mentioned in the following

list. Put dredge over again, also put over trawl twice, as the first time it did not seem to have been at the bottom. This is a noted ground for dredging *Hyalonema*. Obtained a series of temperatures. At 6 P.M. completed trawling and dredging, and proceeded towards Kobé. Station 232.

The following species are recorded in the Zoological Reports from the dredge and trawl at this Station :— Animals from Dredge and Trawl.

Hexactinellida (Schulze, Zool. pt. 53).

Hyalonema (*Stylocalyx*) *apertum*, n.sp. Several specimens; obtained at no other locality.

Alcyonaria (Wright and Studer, Zool. pts. 64 and 81).

Strophogorgia petersi, n.g., n.sp. One specimen; obtained at no other locality.
Dasygorgia geniculata, n.sp. One specimen; obtained also at Station 201.
Ceratoisis paucispinosa, n.sp. Three specimens; obtained at no other locality.
Caligorgia flabellum (Ehrenberg). A few branches; obtained at no other locality by the Challenger. Recorded from Formosa, Japan, and Mauritius.
Acamptogorgia arbuscula (Gray, MS.). One specimen; obtained at no other locality by the Challenger.
Acis pustulata, n.sp. One specimen; obtained at no other locality.
Muricella complanata, n.sp. One specimen; obtained at no other locality.
„ *perramosa*, Ridley. Two specimens; obtained at no other locality by the Challenger. Recorded from Mauritius.
„ *nitida*, Verrill (?). One specimen; obtained at no other locality by the Challenger. Recorded from Central Pacific.
Scirpearella rubra, n.g., n.sp. One specimen; obtained at no other locality.
Juncella racemosa, n.sp. Several specimens; obtained at no other locality.
Gorgonella orientalis, n.sp. One specimen; obtained at no other locality.
Suberogorgia verriculata (Esper). Fragments; obtained at no other locality by the Challenger. Recorded from W. Indies (?) and Australia.
„ *köllikeri*, n.sp. Several pieces; obtained at no other locality.
Keroeides koreni, n.g., n.sp. Several fragments; obtained at no other locality. Only species of the genus.
Melitodes nodosa, n.sp. Several specimens; obtained also at Station 177.
Parisis minor, n.sp. One specimen; obtained at no other locality.
Chironephthya dipsacea, n.g., n.sp. Several fragments; obtained at no other locality.
„ *scoparia*, n.g., n.sp. One specimen; obtained at no other locality.

Station 232.

Chironephthya crassa, n.g., n.sp. Two specimens; obtained at no other locality. The genus *Chironephthya* was not obtained elsewhere.

Siphonogorgia godeffroyi, Kölliker. One specimen; obtained at no other locality by the Challenger. Recorded from Pelew Islands.

Anthogorgia japonica, n.sp. One specimen; obtained at no other locality.

Pennatulida (Kölliker, Zool. pt. 2).

Pennatula naresi, n.sp. One specimen; obtained at no other locality.

Kophobelemnon ferrugineum, n.sp. One specimen; obtained at no other locality.

Actiniaria (Hertwig, Zool. pt. 15).

Stephanactis tuberculata, n.g., n.sp. One specimen; obtained at no other locality. The only other species of the genus (*Stephanactis abyssicola*) was taken at Station 46.

Corals (Moseley, Zool. pt. 7).

Flabellum japonicum, n.sp. Eight specimens; obtained at no other locality. Recorded subsequently from Indian Ocean ("Investigator").

Crinoidea (Carpenter, Zool. pt. 60).

Antedon latipinna, n.sp. One specimen; obtained at no other locality.

Asteroidea (Sladen, Zool. pt. 51).

Pontaster oxyacanthus, n.g., n.sp. Obtained at no other locality.

Astropecten brevispinus, n.sp. Obtained at no other locality.

Pentagonaster japonicus, n.sp. Obtained at no other locality.

„ *arcuatus*, n.sp. Obtained at no other locality. Recorded subsequently from Indian Ocean ("Investigator").

Solaster paxillatus, n.sp. Obtained at no other locality.

Asterias (*Stolasterias*) *stichantha*, n.sp. Obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha flagellata, n.sp. Obtained at no other locality.

„ *imbecillis*, n.sp. Obtained at no other locality.

„ *ponderosa*, n.sp. Obtained at no other locality.

Amphiura bellis, n.sp. Obtained also at Stations 174 and 236.

„ *glauca*, n.sp. Obtained also at Station 236, 775 to 420 fathoms.

Ophiochiton fastigatus, n.g., n.sp. Obtained also at Station 191. The only other species of the genus (*Ophiochiton lentus*) was taken at Station 171.

Ophiomitra normani, n.sp. Obtained also at Stations 235 and 236, 420 to 775 fathoms. Station 232.

Ophiocreas caudatus, n.sp. Obtained at no other locality.

Astronyx loveni, Müller and Troschel. Obtained also at Station 49.

Echinoidea (Agassiz, Zool. pt. 9).

Phormosoma bursarium, n.sp. Obtained also at Stations 200 and 205.

Echinus norvegicus, Düben and Koren. For distribution see Station 46.

Pourtalesia laguncula, n.sp. Obtained also at Stations 168, 169, 191, and 244.

Linopneustes murrayi, n.g., n.sp. Obtained also at Station 210. Only species of the genus.

Hemiaster gibbosus, n.sp. Obtained also at Station 191.

Brissopsis luzonica (Gray). Obtained also at Stations 168, 188, 191, and 203.

Schizaster ventricosus, Gray. Obtained at no other locality by the Challenger.

Holothurioidea (Théel, Zool. pts. 13 and 39).

Lætmogone wyville-thomsoni, n.g., n.sp. (?). One specimen; obtained also at Stations 147, 158, and 300.

Synapta aculeata, n.sp. One specimen; obtained at no other locality.

Ankyroderma simile, n.sp. One specimen; obtained at no other locality.

Nemertea (Hubrecht, Zool. pt. 54).

Eupolia nipponensis, n.sp. Several fragments; obtained at no other locality.

Cerebratulus macroren, n.sp. Obtained also at Station 169.

,, sp. (?).

Annelida (M'Intosh, Zool. pt. 34).

Lætmonice japonica, n.sp. One specimen; obtained at no other locality.

Eunoa yedoensis, n.sp. One specimen; obtained at no other locality.

Leanira areolata, n.sp. One specimen; obtained at no other locality.

Leaniricola rotundata, n.g., n.sp. (Crustacean parasite on *Leanira areolata*).

Lumbriconereis bifurcata, n.sp. One specimen; obtained at no other locality.

,, *japonica*, Marenzeller. One specimen; obtained at no other locality by the Challenger. Recorded from Japan.

Nothria macrobranchiata, n.sp. A few specimens; obtained at no other locality.

Maldane sarsi, Malmgren. Several specimens; obtained at no other locality by the Challenger. Recorded from Europe and America.

Nicomache japonica, n.sp. One specimen; obtained at no other locality.

Praxilla lankesteri, n.sp. One specimen; obtained at no other locality.

Amphicteis japonica, n.sp. One specimen; obtained at no other locality.

Station 232.

Amphipoda (Stebbing, Zool. pt. 67).

Phronima sedentaria (Forskål). One specimen, numerous young, and two houses; obtained at no other locality by the Challenger.

Isopoda (Beddard, Zool. pt. 48).

Munnopsis latifrons, n.sp. One specimen; obtained at no other locality.

Schizopoda (Sars, Zool. pt. 37).

Boreomysis obtusata, n.sp. One specimen; obtained also at Station 252, 2740 fathoms.

Macrura (Spence Bate, Zool. pt. 52).

Benthesicymus altus, n.g., n.sp. One specimen; obtained also at Stations 133, 170, 171, 174, 184, 205, 214, and 235.

Gennadas parvus, n.g., n.sp. Four specimens; for distribution see Station 45.

Sergestes japonicus, n.sp. One specimen; obtained also at Station 207.

„ *atlanticus*, M.-Edwards. One specimen; for distribution see Station 42.

Glyphocrangon hastacauda, n.sp. One specimen; obtained at no other locality.

Heterocarpus alphonsi, n.sp. One specimen; obtained also at Station 214.

Acanthephyra brachytelsonis, n.sp. Three specimens; for distribution see Station 170.

Systellaspis lanceocaudata, n.g., n.sp. One specimen; obtained at no other locality.

Nematocarcinus tenuipes, n.sp. Six specimens; obtained also at Stations 218 and 235.

Brachyura (Miers, Zool. pt. 49).

Macrocheira kämpferi, De Haan. Two specimens; obtained at no other locality by the Challenger. Recorded from Japan.

Lamellibranchiata (Smith, Zool. pt. 35).

Nucula niponica, n.sp. Obtained at no other locality.

Yoldia lischkei, n.sp. Obtained at no other locality.

Limopsis pelagica, n.sp. Obtained also at Station 106.

Pecten vitreus (Chemnitz). For distribution see Station 204.

Gasteropoda (Watson, Zool. pt. 42).

Bembix æola, n.g., n.sp. Obtained also at Station 235, 565 fathoms. Only species of the genus.

Pleurotoma (*Genota*) *engonia*, n.sp. Obtained also at Station 169.

CEPHALOPODA (Hoyle, Zool. pt. 44). STATION 232.

Octopus punctatus, Gabb. One specimen; obtained at no other locality by the Challenger. Recorded from Pacific coast of North America and Hong Kong.

Calliteuthis reversa, Verrill. One specimen; obtained also at Station 168, surface.

FISHES (Günther, Zool. pt. 57).

Centrophorus foliaceus, n.sp. One specimen; obtained at no other locality.

„ *squamulosus*, n.sp. One specimen; obtained at no other locality.

Scombrops chilodipteroides, Bleeker. One specimen; obtained at no other locality by the Challenger.

Sebastes macrochir, n.sp. Several specimens; obtained at no other locality.

Beryx decadactylus, C.V. Two specimens; obtained at no other locality by the Challenger.

Polymixia nobilis, Lowe. Three specimens; obtained at no other locality by the Challenger. Recorded from Atlantic and Indian Oceans.

Lepidopus tenuis, n.sp. One specimen; obtained at no other locality.

Trichiurus lepturus, Linné. Obtained at no other locality by the Challenger. A widely-distributed species.

Ceratias carunculatus, n.sp. One specimen; obtained at no other locality.

Physiculus kaupi, Poey. Five specimens; obtained at no other locality by the Challenger. Recorded from Cuba and St. Helena.

Haloporphyrus inosimæ, n.sp. Several specimens; obtained at no other locality.

Macrurus parallelus, n.sp. Eight specimens; obtained also at Stations 169, 170, 171, and 235.

„ *japonicus*, Schlegel. One specimen; obtained at no other locality by the Challenger.

„ *nasutus*, n.sp. Six specimens; obtained also at Station 235, 565 fathoms. Recorded subsequently from Indian Ocean ("Investigator").

„ *villosus*, n.sp. One specimen; obtained also at Station 214.

„ *macrochir*, n.sp. One specimen; obtained at no other locality.

Gonostoma gracile, n.sp. One specimen; obtained also at Station 230.

Bathythrissa dorsalis, n.g., n.sp. One specimen (obtained from fishermen); obtained at no other locality. Only species of the genus.

Xenodermichthys nodulosus, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Nettastoma parviceps, n.sp. One specimen; obtained at no other locality.

Synaphobranchus pinnatus (Gronovius). Eleven specimens; obtained also at Stations 125, 210, 214, and 235.

Station 232. *Synaphobranchus brevidorsalis*, n.sp. One specimen; obtained also at Station 218.
Myxine australis (Jenyns). Six specimens; obtained at no other locality by the Challenger. Recorded from Magellan Strait.

In addition to the foregoing, the following are recorded in the Station-book:—*Hyalonema sieboldii* and another species (only one species noted above), *Antipathes*, several Lepadids parasitic on *Macrocheira*, small Amphipod, many specimens of a species of *Pycnogonum*.

Excluding Protozoa, over 300 specimens of invertebrates and fishes were obtained at this Station, belonging to about 116 species, of which 84 are new to science, including representatives of 16 new genera; 57 of the new species and 5 new genera were not obtained elsewhere.

Willemoes-Suhm writes: "*Hyalonema sieboldii* is, according to our interpreter, called by the Japanese "umi-wata." Martens gives its literary history and what he saw of it in Japan, but he did not know where the fishermen got the specimens, nor that *Beryx*, *Macrurus*, *Macrocheira*, &c., occur along with *Hyalonema*. An important result of our dredgings to-day is to have found out where these animals, interesting in many ways, live, and which of them live together, the more so as they are associated with members of the universal deep-sea fauna. In one of the Sponges I found small bodies containing what appeared to be a granulated embryo. The Cœlenterata and Echinoderms were represented by numerous large and fine specimens, including *Pourtalesia*—a decidedly deep-sea form. There were several Annelids (*Aphrodita*, *Clymene*, &c.), some with tubes, the most interesting being an *Ophelia*. Lepadids were found in different places, most of them on the back of the big crab. Another deep-sea genus, *Munnopsis*, was represented by a very interesting specimen with enormously long pereiopods, apparently a different species from that taken in the Antarctic. A small Amphipod seemed to be peculiar to the place, and there was a Schizopod with large globular eyes and loose carapace. The shrimps included a spiny and very solid species, previously taken several times in the deep sea, and several other species which almost invariably turn up in deep-water dredgings. Two middle-aged males of *Macrocheira kämpferi* were taken; the Japanese name is "tenanga kani," and the animal has probably been long known to the Japanese. The fishes were so far interesting as they included species of *Macrurus*, *Halosaurus*, and Scopelids, belonging to the great deep-sea fauna, and *Beryx*—a genus peculiar to the *Hyalonema*-ground of Setubal."

Organisms from the Deposit. The following species of Foraminifera and Diatoms were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

FORAMINIFERA (Brady, Zool. pt. 22).—The pelagic species, which make up about 30 per cent. of the carbonate of lime present in the deposit, are marked thus ×. STATION 232.

Biloculina depressa, d'Orbigny.
Miliolina amygdaloides, Brady.
„ *pygmæa* (Reuss).
Planispirina celata (Costa).
Reophax scorpiurus, Montfort.
Haplophragmium foliaceum, Brady.
Textularia gramen, d'Orbigny.
„ *inconspicua*, Brady.
„ *quadrilatera*, Schwager.
Clavulina communis, d'Orbigny.
Bulimina aculeata, d'Orbigny.
„ *contraria* (Reuss).
„ *elegans*, d'Orbigny, var. *exilis*, Brady.
„ *inflata*, Seguenza.
„ *marginata*, d'Orbigny.
„ *pyrula* d'Orbigny.
„ *subornata*, Brady.
Virgulina squamosa, d'Orbigny.
„ *subsquamosa*, Egger.
Bolivina beyrichi, Reuss.
„ *karreriana*, Brady.
„ *punctata*, d'Orbigny.
„ *robusta*, Brady.
Cassidulina bradyi, Norman.
„ *crassa*, d'Orbigny.
„ *lævigata*, d'Orbigny.
Chilostomella ovoidea, Reuss.
Allomorphina trigona, Reuss.
Lagena castrensis, Schwager.
„ *distoma*, Parker and Jones.
„ *gracillima* (Seguenza).
„ *hispida*, Reuss.
„ *lævis* (Montagu).
„ *marginata* (Walker and Boys).
„ *orbignyana* (Seguenza).
Lagena striata (d'Orbigny).
„ *sulcata* (Walker and Jacob).
Nodosaria mucronata (Neugeboren).
„ *pyrula*, d'Orbigny.
„ *scalaris* (Batsch).
Marginulina glabra, d'Orbigny.
Cristellaria rotulata (Lamarck).
„ *variabilis*, Reuss.
Uvigerina asperula, Czjzek.
„ *pygmæa*, d'Orbigny.
Sagrina bifrons, Brady.
„ *raphanus*, Parker and Jones.
× *Globigerina bulloides*, d'Orbigny.
× „ *dubia*, Egger.
× „ *inflata*, d'Orbigny.
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Pullenia obliquiloculata*, Parker and Jones.
„ *sphæroides* (d'Orbigny).
Sphæroidina bulloides, d'Orbigny.
× „ *dehiscens*, Parker and Jones.
Truncatulina lobatula (Walker and Jacob).
„ *wuellerstorfi* (Schwager).
Anomalina grosserugosa (Gümbel).
× *Pulvinulina canariensis* (d'Orbigny).
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
„ *partschiana* (d'Orbigny).
× „ *tumida*, Brady.
„ *umbonata*, Reuss.
Rotalia orbicularis, d'Orbigny.
Nonionina scapha (Fichtel and Moll).
„ *turgida* (Williamson).
Polystomella crispa (Linné).
Operculina ammonoides (Gronovius).

DIATOMACEÆ.—The following species were observed by Mr. Comber.

Amphora spectabilis, Gregory.
„ *crassa*, Gregory.
„ *gigantea*, Gregory.
„ *proteus*, Gregory.
„ *inflata*, Grunow.
„ *scala*, Cleve.
„ *studeri*, Janisch.
„ *mexicana*, A. Schmidt.
„ *reflexa*, Grove, MS.
Cymbella gastroides, Kutzing (fresh water).
Navicula lyra, Ehrenberg.
„ *clavata*, Gregory.
„ *hennedyii*, Smith.
„ *prætexta*, Ehrenberg.
„ *impressa*, Grunow.
„ *spectabilis*, Gregory.
„ *nebulosa*, Gregory.
„ *bullata*, Norman.

Station 232.

Navicula brasiliensis, Grunow.
„ *maxima*, Gregory.
„ *liber*, Smith.
„ *smithii*, Ralfs.
„ *nitescens*, Ralfs.
„ *egyptiaca*, Greville.
„ *bomboides*, A. Schmidt.
„ *crabro*, Ehrenberg.
„ *multicostata*, Grunow.
„ *entomon*, Kutzing.
„ *pandura*, Brebisson.
„ *pelagi*, A. Schmidt.
„ *gemmata*, Greville.
„ *aspera*, Ehrenberg.
Alloioneis antillarum, Cleve and Grunow.
Pleurosigma pulchrum, Grunow.
„ *affine*, Grunow, var. *normanni*, Ralfs.
Rhoikosigma reichardtii, Grunow.
Gomphonema geminatum, Agardh (fresh water).
Epithemia turgida, Kutzing (fresh water).
Cocconeis heteroidea, Hantzsch.
„ *pellucida*, Hantzsch.
„ *pseudomarginata*, Gregory.
„ *scutellum*, Ehrenberg.
Orthoneis splendida, Grunow.
Sceptroneis clavus, Kitton.
Grammatophora stricta, Ehrenberg.
„ *gibberula*, Kutzing.
„ *japonica*, Grunow.
„ *adriatica*, Grunow.
Synedra goulardii, Brebisson.
„ *superba*, Kutzing.
„ *doliolus*, Wallich.
Nitzschia jelinekii, Grunow.
„ *weissflogii*, Grunow.
„ *distans*, Gregory.
„ *marina*, Grunow.
„ *panduriformis*, Gregory.
„ *recta*, Hantzsch.
Surirella fastuosa, Ehrenberg.
„ *japonica*, A. Schmidt.
Campylodiscus bicinctus, Castracane.
„ *crosus*, Castracane, and var.
„ *latus*, Shadbolt.
„ *biangulatus*, Greville.
„ *pfitzeri*, A. Schmidt.
„ *undulatus*, Greville.
Perrya pulcherrima, Kitton.
Rhaphoneis gemmifera, Ehrenberg.
„ sp. (?).
Glyphodesmis fusiformis, Cleve and Grunow (?).
Rhabdonema adriaticum, Kutzing.
Achnanthes sp. (?).
Gephyria media, Arnott.
„ *gigantea*, Greville.
Climacosphenia moniligera, Ehrenberg.
„ *elongata*, Bailey.
Euphyllodium sp. (?).
Asteromphalus darwinii, Ehrenberg.
„ *elegans*, Greville.
„ *cleveanus*, Grunow.
Actinocyclus punctulatus, Castracane.
„ *complanatus*, Castracane.
„ *japonicus*, Castracane.
„ *pruinosus*, Castracane.
„ sp. (?).
Actinoptychus splendens, Ralfs, var. *halionyx*, Grunow.
„ *undulatus*, Ehrenberg, and var.
„ *areolatus*, A. Schmidt.
Coscinodiscus lineatus, Ehrenberg.
„ *leptopus*, Janisch.
„ *bipartitus*, Rattray.
„ *excentricus*, Ehrenberg.
„ *subtilis*, Ehrenberg, and var.
„ *nitidus*, Gregory.
„ *radiatus*, Ehrenberg.
„ „ var. *media*, Grunow.
„ „ var. *minor*, Grunow.
„ *fimbriatus*, Ehrenberg.
„ *oculus-iridis*, Ehrenberg.
„ *asteromphalus*, Ehrenberg.
„ „ var. *princeps*, Grunow.
„ „ var. *pulchra*, Grunow.
„ *centralis*, Ehrenberg.
„ *concinnus*, Smith.
„ „ var. *jonesiana*, Rattray.
„ *gigas*, Ehrenberg.
„ *apiculatus*, Ehrenberg, var. *woodwardii*, Rattray.
„ sp. (?).
Paralia sulcata, Cleve.
Podosira maxima, Grunow.
Hyalodiscus stelliger, Bailey.
„ *ambiguus*, Grunow.
Cyclotella stylorum, Brightwell.
Stictodiscus japonicus, Castracane.
„ *californicus*, Greville.
„ „ var. *areolatus*, Grunow.
„ „ var. *nankoorensis*, Grunow.
„ *bicoronatus*, Castracane.

Stictodiscus parallelus, A. Schmidt, forma *trigona*.
Arachnoidiscus ornatus, Ehrenberg.
Stephanopyxis turris, Ralfs, var. *brevispina*, Grunow.
Auliscus cœlatus, Bailey.
Isthmia nervosa, Kutzing.
„ *enervis*, Ehrenberg.
Biddulphia pulchella, Gray.
„ *grundleri*, A. Schmidt.
Cerataulus turgidus, Ehrenberg.
Triceratium favus, Ehrenberg.
„ *grande*, Brightwell.
„ *affine*, Grunow.
„ *tumescens*, Castracane.
Triceratium arcticum, Brightwell.
„ *calvescens*, Castracane.
„ *gibbosum*, Bailey.
„ *undulatum*, Ehrenberg.
Euodia janischii, Grunow.
Hemidiscus cuneiformis, Wallich.
„ *ventricosa*, Castracane.
„ sp. (?).
Aulacodiscus affinis, Grunow.
„ *polygonus*, Grunow.
Hercotheca mamillaris, Ehrenberg.
Chætoceros coarctata, Lauder.
Bacteriastrum spirillum, Castracane.

Station 232.

Proximity to land is indicated by the presence of several fresh-water species.

Surface Organisms.—The following species are recorded from the surface in the neighbourhood of this Station :— Organisms from Surface-Nets.

Radiolaria (Haeckel, Zool. pt. 40).

Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Auloceros furcosus, Haeckel.
Sagoplegma pyramidophora, Haeckel.
Medusetta quadrigata, Haeckel.
Castanissa crosbiei, Haeckel.

Ostracoda (Brady, Zool. pt. 3).

Halocypris atlantica, Lubbock.
„ *brevirostris*, Dana.
„ *imbricata*, n.sp.

Tunicata (Herdman, Zool. pt. 76).

Salpa runcinata - fusiformis, Chamisso—Cuvier.

In addition, Diatoms, *Peridinium*, *Daphnia* in quantities, and Copepods, are recorded in the note-books.

Stations 233 and 233A, off Japan (see Chart 35).

Stations 233 and 233A.

May 17 and 19, 1875.

While the ship was at anchor at Kobé, the steam pinnace was out dredging in the bay on these dates in depths of 8 to 50 fathoms; the deposit in 8 fathoms was a Blue Mud, containing 11·32 per cent. of carbonate of lime (Station 233), and in 50 fathoms, off the lighthouse in Akasi Strait, the deposit was Sand (Station 233A).

The following species are recorded in the Zoological Reports from the dredgings at these Stations :— Animals from Dredge.

Keratosa (Poléjaeff, Zool. pt. 31).

Cacospongia collectrix (Schulze). One specimen; obtained also at Station 203.

Stations 233 and 233A.

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Myxilla rosacea (Lieberkühn), var. *japonica*, nov. Three specimens and fragments; obtained at no other locality. The species recorded from Mediterranean.

Tetractinellida (Sollas, Zool. pt. 63).

Myriastra subtilis, n.g., n.sp. Two specimens; obtained at no other locality.

Alcyonaria (Wright and Studer, Zool. pts. 64 and 81).

Echinogorgia modesta, n.sp. One specimen; obtained at no other locality.

Euplexaura pinnata, n.sp. Several specimens; obtained at no other locality.

„ *parciclados*, n.sp. One specimen; obtained at no other locality.

Pennatulida (Kölliker, Zool. pt. 2).

Lituaria phalloides, Pallas (?). One specimen; obtained at no other locality by the Challenger.

Asteroidea (Sladen, Zool. pt. 51).

Astropecten polyacanthus, Müller and Troschel. For distribution see Port Jackson.

„ *japonicus*, Müller and Troschel. Many specimens; obtained also at Station 233B and Yokohama.

Asterina penicillaris (Lamarck). Obtained at no other locality by the Challenger. Recorded from Indian and Pacific Oceans.

Asterias versicolor, n.sp. Several specimens; obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Amphiura impressa (Ljungman) (?). Obtained at no other locality by the Challenger. Recorded from East Indies.

Ophionereis schayeri (Müller and Troschel) (?). Obtained also at Station 162.

Ophiothrix ciliaris (Lamarck) (?). Obtained also at Station 209.

Echinoidea (Agassiz, Zool. pt. 9).

Temnopleurus hardwicki (Gray). Obtained also at Station 192, Arafura Sea, and Yokohama.

Pleurechinus bothryoides, Agassiz. Obtained also at Station 186.

Echinocardium australe, Gray. Obtained also at Port Jackson.

Schizaster japonicus, n.sp. Obtained also at Stations 188, 233B, Yokohama, and Hong Kong.

HOLOTHURIOIDEA (Théel, Zool. pt. 39). STATIONS 233 AND 233A.

Synapta distincta, Marenzeller. Several fragments; obtained also at Station 233B, 15 fathoms. Recorded from Japan and Amoy.

„ *incerta*, Ludwig, var. *variabilis*, nov. Several fragmentary specimens; obtained at no other locality. Recorded from Sunda Islands.

Colochirus inornatus, Marenzeller. Ten specimens; obtained at no other locality by the Challenger. Recorded from Japan or China.

Orcula hypsipyrga, Marenzeller. One specimen; obtained at no other locality by the Challenger. Recorded from Japan or China.

ANNELIDA (M'Intosh, Zool. pt. 34).

Palmyra aurifera, Savigny (?). One specimen; obtained at no other locality by the Challenger. Recorded from Isle of France.

Lepidonotus gymnonotus, Marenzeller. Several specimens; obtained at no other locality by the Challenger. Recorded from Japan.

Polynoë ocellata, n.sp. Numerous specimens (commensalistic in tubes of *Phyllochætopterus claparedii*); obtained at no other locality.

Leanira japonica, n.sp. One specimen; obtained at no other locality.

Nereis (*Platynereis*) *kobiensis*, n.sp. Two specimens; obtained at no other locality.

Lumbriconereis heteropoda, Marenzeller. One specimen; obtained also at Yokohama, 5 to 25 fathoms. Recorded from Japan.

Eunice kobiensis, n.sp. One specimen; obtained at no other locality.

Phyllochætopterus claparedii, n.sp. Numerous specimens; obtained at no other locality.

Pista fasciata (Grube) (?). One specimen; obtained at no other locality by the Challenger.

Dasychone picta, n.sp. One specimen; obtained at no other locality.

„ *japonica*, n.sp. One specimen; obtained at no other locality.

Hydroides multispinosa, Marenzeller. One specimen; obtained at no other locality by the Challenger. Recorded from Japan.

CIRRIPEDIA (Hoek, Zool.pt. 25).

Balanus trigonus, Darwin. Two specimens; obtained also at Port Jackson.

„ *rostratus*, n.sp. Twelve specimens; obtained at no other locality.

„ *amaryllis*, Darwin. Several specimens; obtained also at Station 186.

AMPHIPODA (Stebbing, Zool. pt. 67).

Amphithoë japonica, n.sp. Three specimens; obtained at no other locality.

Stations 233 and 233A.

Caprella scaura, Templeton. Six specimens (50 fathoms); obtained at no other locality by the Challenger. Recorded from Australia, Mauritius, and Rio Janeiro.

Isopoda.

Three specimens, genus and species undetermined.

Stomatopoda (Brooks, Zool. pt. 45).

Squilla nepa, Latreille. One specimen; obtained also at Station 233B, Yokoska, and Sandwich Islands, 5 to 25 fathoms.

Macrura (Spence Bate, Zool. pt. 52).

Penæus velutinus, Dana. Twenty-one specimens; obtained also at Stations 184, 186, 187, 188, and 190.

„ *tenellus*, n.sp. One specimen; obtained at no other locality.

Crangon affinis, De Haan. Twelve specimens; obtained also at Station 233B, 15 fathoms. Recorded from Japan.

Alpheus longimanus, n.sp. Four specimens; obtained also at Yokoska, 5 to 20 fathoms.

Nauticaris futilirostris, n.g., n.sp. One specimen; obtained at no other locality.

Leptochela gracilis, Stimpson. Two specimens; obtained at no other locality by the Challenger. Recorded from Japan.

Brachyura (Miers, Zool. pt. 49).

Achæus japonicus, De Haan. One specimen; obtained at no other locality by the Challenger. Recorded from Japan.

Scyra compressipes, Stimpson. One specimen; obtained at no other locality by the Challenger. Recorded from Japan.

Lophozozymus (*Lophoxanthus*) *bellus*, Stimpson, var. *leucomanus*, Lockington. Several specimens; obtained at no other locality by the Challenger. Recorded from California and Japan.

Sphærozius nitidus, Stimpson. One specimen; obtained at no other locality by the Challenger. Recorded from Hong Kong.

Pilumnus minutus, De Haan (?), var. *hirsutus*, Stimpson. Several specimens; obtained at no other locality by the Challenger. Recorded from China, New Caledonia, and Australia.

„ *globosus*, Dana. Two specimens; obtained at no other locality by the Challenger. Recorded from Tahiti and Paumotu Islands.

Neptunus (*Amphitrite*) *hastatoides* (Fabricius). One specimen; obtained also at Stations 188, 233B, and Hong Kong.

Goniosoma variegatum (Fabricius), var. *bimaculatum*, nov. Four specimens; obtained at no other locality. Stations 233 and 233A.

Macrophthalmus serratus, Adams and White. Two specimens; obtained at no other locality by the Challenger. Recorded from Philippines.

Platygrapsus depressus (De Haan). One specimen; obtained at no other locality by the Challenger. Recorded from China and Japan.

Arcania septemspinosa (Fabricius). One specimen; obtained also at Station 233B and Hong Kong.

Leucosia craniolaris (Linné). Two specimens; obtained also at Stations 188, 190, and Hong Kong.

Dorippe japonica, Siebold. One specimen; obtained at no other locality by the Challenger. Recorded from China and Japan.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Tapes (*Paratapes*) *undulata* (Born). Obtained also at Station 189.

Venus (*Chione*) *scabra*, Hanley. Obtained at no other locality by the Challenger. Recorded from Philippines and Australia.

Nucula (*Acila*) *mirabilis*, Adams and Reeve. Obtained at no other locality by the Challenger. Recorded from Japan.

Arca (*Macrodon*) *dalli*, n.sp. Obtained at no other locality.

Modiola barbata (Linné). Obtained at no other locality by the Challenger. Recorded from Europe.

Pecten (*Janira*) *laqueatus*, Sowerby. Obtained at no other locality by the Challenger. Recorded from Japan.

Anomia laqueata, Reeve, var. (?). Obtained at no other locality by the Challenger.

GASTEROPODA (Watson, Zool. pt. 42).

Nassa (*Niotha*) *siquijorensis*, Adams. Obtained at no other locality by the Challenger. Recorded from Philippines.

„ (*Zeuxis*) *crenulata*, Bruguière. Obtained also at Stations 233B and 233C, 15 and 12 fathoms. Recorded from Indian Seas, Philippines, and Australia.

Cancellaria spengleriana, Deshayes. Obtained at no other locality by the Challenger. Recorded from Philippines, China, and Japan.

Pleurotoma (*Typhlomangelia*) *pyrrha*, n.sp. Obtained at no other locality.

Terebra bathyraphe, Smith. Obtained at no other locality by the Challenger. Recorded from Japan.

Stations 233 and 233a.

Capulus (*Amathina*) *tricarinatus* (Linné). Obtained also at Stations 186 and 187.
Crepidula aculeata (Gmelin). Obtained also at Port Jackson.
Lamellaria sp. (?).
Philine sp. (?).
Pleurobranchus sp. (?).

Cephalopoda (Hoyle, Zool. pt. 44).

Inioteuthis morsei, Verrill. Four specimens; obtained at no other locality by the Challenger. Recorded from Hong Kong and Japan.

Sepia kobiensis, n.sp. One specimen; obtained at no other locality.
Loligo kobiensis, n.sp. One specimen; obtained also at Station 233c, 12 fathoms.

Polyzoa (Busk, Zool. pt. 30).

Retepora victoriensis, n.sp. (?), var. *japonica*, nov. The species obtained also at Station 161.

Lepralia japonica, n.sp. Obtained at no other locality.

Tunicata (Herdman, Zool. pts. 17 and 38).

Styela clava, n.sp. Several specimens; obtained at no other locality.
Corella japonica, n.sp. About twelve specimens; obtained also at Yokohama and Hong Kong.
Ciona savignyi, n.sp. One specimen; obtained at no other locality.
„ *aspera*, n.sp. One specimen; obtained at no other locality.
Leptoclinum japonicum, n.sp. One colony; obtained at no other locality.

Fishes (Günther, Zool. pt. 6).

Apogon lineatus, Schlegel. Obtained also in Yokohama Bay.
Hapalogenys mucronatus, Eydoux and Souleyet. Obtained at no other locality by the Challenger.
Trypauchen vagina, Bl. Schn. Obtained also at Amboina and Hong Kong.

In addition to the foregoing, the following are recorded in the Station-book:—Nemertean with eggs (*Cephalothrix*), *Pagurus*, large Nudibranch, small reddish fish with hidden eyes and peculiar nose-organ (*Amblyopus*), and several other fishes from fishermen or caught with trammel in their boat (three species of fishes only noted above).

Excluding Protozoa, over 300 specimens of invertebrates and fishes were obtained at this place, belonging to about 90 species, of which 30 are new to science, including representatives of 2 new genera; 27 of the new species were not obtained elsewhere.

Stations 233 and 233a

Moseley writes: "In dredging at Kobé a fish (*Amblyopus*) was obtained, which is almost devoid of eyes, has the skin naked, except towards the tail, where there are rudimentary scales. An elevated crest or ridge-like organ runs along the middle of the top of the snout, and is continued on the chin; this on examination proved to be a sense-organ. It was richly provided with nerves, which go to the bottoms of long pits opening externally, and traversing them are connected all round with a system of elongate radially-disposed cells within these pits. The ridge itself is made up of a great thickening of the epithelial layer of the skin, the epithelial cells being elongated. The fish is of a bright red colour when fresh, from the blood showing through the transparent skin."

Willemoes-Suhm writes: "Moseley found a remarkable fish, living in the mud at 8 fathoms, of a pale reddish colour and with a peculiar organ on its nose. In shape it was like an *Ophidium*, and must have been plentiful in the bay, as nearly every haul brought up a specimen. Moseley also got many tubes and animals of *Chætopterus*, a genus I have not seen since leaving Europe."

Organisms from the Deposit.

Diatomaceæ.—The following species of Diatoms were observed by Mr. Rattray in the deposit from Station 233 :—

Coscinodiscus oculus-iridis, Ehrenberg.
,, ,, var. *loculifera*, Rattray.
,, *concinnus*, W. Smith, var. *jonesiana*, Rattray.
,, *radiatus*, Ehrenberg.
,, *nobilis*, Grunow.
,, *normanii*, Gregory.
,, *rex*, Wallich.
,, *decussatus*, Grove and Sturt.
,, *gigas*, Ehrenberg, var. *diorama*, Grunow.
,, *perforatus*, Ehrenberg.
,, *apiculatus*, Ehrenberg, var. *ambigua*, Grunow.
,, *marginatus*, Ehrenberg.
Hyalodiscus stelliger, Bailey (= *Podosira maculata*, W. Smith, *Craspedodiscus stella*, Ehrenberg).
,, *subtilis*, Bailey.
Actinocyclus ehrenbergii, Ralfs.
Arachnoidiscus ornatus, Ehrenberg, var.
Actinoptychus undulatus, Ehrenberg.
Melosira sulcata, Kutzing, var. *biseriata*, Grunow.
,, sp. (?).
Hemidiscus cuneiformis, Wallich.
Campylodiscus undulatus, Greville.
,, *kittonianus*, Greville.
,, *dæmelianus*, Grunow.
,, *latus*, Shadbolt, var.
,, *bicostatus*, W. Smith, var.
,, *samoensis*, Grunow.
Campylodiscus echineis, Ehrenberg.
Surirella fastuosa, Ehrenberg.
,, *fluminensis*, Grunow, var.
,, sp. (?).
Triceratium favus, Ehrenberg.
Alloioneis antillarum, Cleve.
Navicula spectabilis, Gregory.
,, *lyra*, Ehrenberg, var. *elliptica*, A. Schmidt.
,, *crabro*, Kutzing.
,, *major*, Kutzing (fresh water).
Nitzschia plana, W. Smith.
,, (*Tryblimella*) *salinarum*, Grunow.
,, *punctata*, Grunow, var. *coarctata*, Grunow.
Pleurosigma æstuarii, W. Smith.
,, *strigosum*, W. Smith.
,, *balticum*, W. Smith.
Biddulphia pulchella, Gray.
Thalassiothrix frauenfeldii, Grunow.

Station 233B.

Station 233B (Sounding 373), off Japan (see Chart 35).

May 26, 1875 ; lat. 34° 18′ N., long. 133° 35′ E.
Temperature of air at noon, 71°·8 ; mean for the day, 67°·9.
Temperature of water at surface, 66°·3.
Density at 60° F. at surface, 1·02631.
Depth, 15 fathoms ; deposit, Blue Mud, containing 4·29 per cent. of carbonate of lime, and numerous oval-shaped pellets, believed to be the dung of Holothurians (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5 A.M. got up steam. At 6.15 A.M. weighed anchor and proceeded through the channels leading from Harima Nada to Bingo Nada. At 9.5 A.M. passed Odutsi Island. At 11.20 A.M. stopped to dredge in about 12 fathoms to the east of the headland of Akeno Misaki. At 11.50 A.M. proceeded. At 12.40 P.M. stopped, and put over trawl in about 15 fathoms. The dredge came up with a bag full of mud, and the trawl came up at 1.30 P.M. with numerous specimens. Proceeded towards Miwara. After crossing the northern part of the Bingo Nada, the ship stopped at 4.15 P.M. off the village of Matsuhama, and close to the town of Miwara, both situated on the mainland of Nipon, and anchored in 14 fathoms.

Animals from Dredge and Trawl.

The following species are recorded in the Zoological Reports from the dredge and trawl at this Station :—

Asteroidea (Sladen, Zool. pt. 51).

Astropecten japonicus, Müller and Troschel. Many specimens ; obtained also at Station 233 and Yokohama.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha sinensis, Lyman. Several specimens ; obtained also at Yokohama.
Amphiura depressa, Lyman (?). Obtained also at Fiji.

Echinoidea (Agassiz, Zool. pt. 9).

Echinocardium australe, Gray. Obtained also at Port Jackson. [Recorded in error from Station 234].
Schizaster japonicus, n.sp. Several specimens ; obtained also at Stations 188, 233, Yokohama, and Hong Kong.

Holothurioidea (Théel, Zool. pt. 39).

Synapta distincta, Marenzeller. Several fragments ; obtained also at Station 233.

Annelida (M'Intosh, Zool. pt. 34).

Chloeia flava (Pallas). Two specimens ; obtained also in Arafura Sea (?).
Dasybranchus (?) sp. One specimen.

Ostracoda (Brady, Zool. pt. 3). Station 233B.

Cythere acupunctata, n.sp. Obtained at no other locality.
,, *bicarinata*, n.sp. Obtained at no other locality.
,, *cymba*, Brady. Obtained also at Hong Kong.
,, *quadriaculeata*, n.sp. Obtained also at Sandwich Islands, 40 fathoms.
,, *hodgii*, Brady. Numerous specimens ; obtained at no other locality by the Challenger. Recorded from Levant (?) and Malay Archipelago.
,, *darwini*, Brady. Obtained also at Hong Kong.
,, *scabrocuneata*, n.sp. Obtained also at Station 162 and Wellington Harbour, N.Z.
Krithe hyalina, n.sp. Obtained at no other locality.
Loxoconcha sinensis, Brady. Obtained also at Hong Kong.

Stomatopoda (Brooks, Zool. pt. 45).

Squilla nepa, Latreille. One specimen ; obtained also at Station 233, Yokoska, and Sandwich Islands.
,, *fasciata*, De Haan. Two specimens; obtained at no other locality by the Challenger. Recorded from Japan.

Macrura (Spence Bate, Zool. pt. 52).

Penæus velutinus, Dana. Two specimens ; for distribution see Station 184. [Recorded in error from Station 234].
Crangon affinis, De Haan. Four specimens ; obtained also at Station 233.
Alpheus avarus, Fabricius. One specimen ; for distribution see Station 172. [Recorded in error from Station 234].

Brachyura (Miers, Zool. pt. 49).

Neptunus (*Amphitrite*) *hastatoides* (Fabricius). Three specimens ; obtained also at Stations 188, 233, and Hong Kong.
Pilumnoplax vestita (De Haan), var. *sexdentata*, Haswell. One specimen ; obtained also at Yokoska. Recorded from Japan and Australia.
Arcania septemspinosa (Fabricius). Three specimens ; obtained also at Kobé and Hong Kong.

Gasteropoda (Watson, Zool. pt. 42).

Nassa (*Zeuxis*) *crenulata*, Bruguière. Obtained also at Stations 233 and 233C.
Philine sp. (?).

In addition to the foregoing, the Station-book records :—*Holothuria*, many Caridid shrimps, *Solea*, and *Platycephalus*.

STATION 233B. Excluding Protozoa, over 80 specimens of invertebrates and fishes were obtained at this Station, belonging to about 32 species, of which 6 are new to science; 3 of the new species were not obtained elsewhere.

STATION 233C. **Station 233C** (Sounding 374), off Japan (see Chart 35).

May 28, 1875; lat. 34° 18′ N., long. 133° 21′ E.
Temperature of air at noon, 69°·0; mean for the day, 67°·0.
Temperature of water :—

	°		°
Surface, ...	66·8	7 fathoms, . . .	62·1
1 fathom, . . .	65·5	8 „	61·5
2 fathoms, . . .	64·9	9 „	60·9
3 „	64·4	10 „	60·3
4 „	63·8	11 „	59·7
5 „	63·2	Bottom, ...	59·2
6 „	62·7		

Density at 60° F. at surface, 1·02381.
Depth, 12 fathoms; deposit, Blue Mud, containing 4·29 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 7.30 A.M. got up steam. At 9.40 A.M. weighed anchor and proceeded under steam towards Bingo Nada. At 11.15 A.M. passed Hyakfu Kung Island. At 12.15 P.M. stopped to trawl and obtain serial temperatures. The first haul of the trawl was unsuccessful, but at 1.15 P.M. the trawl came up for the second time with many specimens. At 1.30 P.M. proceeded. At 2.30 P.M. passed Matsu Sima. At 3.15 P.M. stopped and anchored in 9 fathoms off Sanagi Sima, at entrance to channel leading to Harima Nada.

ANIMALS FROM TRAWL. The following species are recorded in the Zoological Reports from the trawl at this Station :—

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Raeta pulchella (Adams and Reeve). Obtained also at Yokohama. Recorded from Borneo and Japan.

GASTEROPODA (Watson, Zool. pt. 42).

Nassa (*Zeuxis*) *crenulata*, Bruguière. Obtained also at Stations 233 and 233B.
Philine sp. (?).

CEPHALOPODA (Hoyle, Zool. pt. 44).

Loligo kobiensis, n.sp. Four specimens; obtained also at Station 233.

In addition to the foregoing, the following are recorded in the Station-book :—Many small Spatangids, many specimens of *Astropecten*, Annelid, two specimens of *Squilla*, *Alpheus*, many specimens of *Crangon*, many Caridid shrimps, several crabs (*Lupea*, &c.), blind Ophidiid (*Amblyopus*), several specimens of *Platycephalus*, many specimens of *Solea*, *Gobius*, and some other small fishes. Station 233c.

Excluding Protozoa, over 100 specimens of invertebrates and fishes were obtained at this Station, belonging to about 20 species, of which 1 is new to science.

Station 234 (Sounding 375), off Japan (see Chart 35 and Diagram 16). Station 234.

June 3, 1875 ; lat. 32° 31′ N., long. 135° 39′ E.
Temperature of air at noon, 67°·8 ; mean for the day, 69°·1.
Temperature of water :—

	°		°
Surface, ...	69·5	175 fathoms, . . .	49·7
25 fathoms, . . .	66·8	200 „ . . .	48·0
50 „ . . .	63·0	225 „ . . .	46·2
75 „ . . .	60·0	250 „ . . .	44·9
100 „ . . .	57·0	275 „ . . .	43·5
125 „ . . .	54·3	300 „ . . .	42·2
150 „ . . .	52·0	Bottom, . . .	35·8

Density at 60° F. at surface, 1·02541.
Depth, 2675 fathoms; deposit, Blue Mud, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5 A.M. stopped and sounded in 2675 fathoms. Obtained serial temperatures down to 300 fathoms. At 9.10 A.M. completed temperatures and proceeded under sail ; Oosima lighthouse about 39 miles N.E. The surface temperatures observed indicated the presence of the Japan stream during the whole of the day. Black albatrosses, black petrels, and several swallows about the ship.

The following species are recorded in error from this Station, having evidently come from the shallow-water dredgings at the previous Station :—

Echinoidea (Agassiz, Zool. pt. 9).
Echinocardium australe, Gray.

Macrura (Spence Bate, Zool. pt. 52).
Penæus velutinus, Dana.
Alpheus avarus, Fabricius.

Station 234. Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Heliosphæra castanella, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Auloceros furcosus, Haeckel.
Sagoplegma pyramidophora, Haeckel.
Medusetta quadrigata, Haeckel.
Castanissa crosbiei, Haeckel.

In addition, the following are recorded in the note-books from the surface and down to a depth of 60 fathoms :—Very many *Noctiluca* at the surface, nearly all with prey inside and more or less collapsed, unlike in this respect the quite spherical specimens taken while at anchor at Oosima ; *Noctiluca* was less abundant in the deep haul ; *Pyrocystis*, very few at the surface, more abundant in deep haul ; *Peridinium tripos* (*in catena*) and another species ; Diatoms (*Coscinodiscus*, &c.) ; *Globigerina*, *Orbulina*, *Hastigerina* ; *Vorticella* (on Diatoms) and other Infusoria ; Medusæ, Siphonophoræ, Ophiurid larvæ, *Sagitta*, Annelid larvæ, Planarian larvæ, *Daphnia*, *Cypridina*, *Setella*, Calanids, and other Copepods, Phronimids, *Euphausia*, *Lucifer*, Crustacean and other eggs, Zoëæ, small Gasteropods and Lamellibranchs, *Atlanta*, Pteropods and larvæ, *Appendicularia*, *Doliolum*. The hauls from the surface appeared to indicate a mixture of shallow-water (neritic) and pelagic organisms, and the presence probably of brackish water, while the deeper haul was much more oceanic in character.

Station 235.

Station 235 (Sounding 376), off Japan (see Chart 35).

June 4, 1875 ; lat. 34° 7′ N., long. 138° 0′ E.
Temperature of air at noon, 69°·8 ; mean for the day, 69°·4.
Temperature of water :—

Surface,	73·0	125 fathoms,	57·7
25 fathoms,	71·2	150 „	54·7
50 „	66·4	175 „	51·5
75 „	63·5	200 „	48·0
100 „	60·5	Bottom,	38·1

Density at 60° F. at surface, 1·02557 ; bottom, 1·02560.
Depth, 565 fathoms ; deposit, Green Mud, containing about 5 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 8.30 A.M. observed land about Cape Sima on the port quarter. At 4 P.M. stopped and sounded in 565 fathoms. Put over trawl, which came up at 7.30 P.M. with many

specimens and a few pumice-stones. At 8 P.M. proceeded under steam against a strong headwind from E.N.E. which continued all night. Black albatrosses and black petrels were observed. STATION 235.

Distance at noon from Rock Island lighthouse, 86 miles. Made good 82 miles. No current.

The following species are recorded in the Zoological Reports from the trawl at this Station :— ANIMALS FROM TRAWL.

ALCYONARIA (Wright and Studer, Zool. pt. 64).

Strophogorgia verrilli, n.g., n.sp. Several specimens ; obtained also at Station 237, 1875 fathoms.

Anthomastus steenstrupi, n.sp. One specimen ; obtained at no other locality.

PENNATULIDA (Kölliker, Zool. pt. 2).

Pennatula pearceyi, n.sp. Two specimens ; obtained at no other locality.

Virgularia bromleyi, n.sp. One specimen ; obtained at no other locality.

Umbellula durissima, n.sp. One specimen ; obtained at no other locality.

„ *huxleyi*, n.sp. Four specimens ; obtained at no other locality.

Microptilum willemöesi, n.g., n.sp. One specimen ; obtained at no other locality. Only species of the genus.

Scleroptilum durissimum, n.g., n.sp. One specimen ; obtained at no other locality. The only other species of the genus (*Scleroptilum grandiflorum*) was taken at Station 241.

ACTINIARIA (Hertwig, Zool. pt. 15).

Polysiphonia tuberosa, n.g., n.sp. Twenty specimens ; obtained at no other locality. Only species of the genus.

Epizoanthus parasiticus, Verrill. Two specimens ; obtained at no other locality by the Challenger.

CRINOIDEA (Carpenter, Zool. pts. 32 and 60).

Pentacrinus (?) *mollis*, n.sp. One specimen ; obtained at no other locality.

Eudiocrinus japonicus, n.g., n.sp. Three specimens ; obtained at no other locality.

ASTEROIDEA (Sladen, Zool. pt. 51).

Pararchaster semisquamatus, n.g., n.sp. One specimen ; obtained also at Station 237, 1875 fathoms.

Hymenaster glaucus, n.sp. Several specimens ; obtained at no other locality.

Station 235.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha lapidaria, n.sp. Obtained at no other locality.
Ophiomusium lymani, Wyville Thomson. For distribution see Station 45.
Ophiopholis japonica. n.sp. Obtained also at Station 236, 420 to 775 fathoms.
Amphiura acacia, n.sp. Obtained at no other locality.
Ophiacantha scolopendrica, n.sp. [See *Bull. Mus. Comp. Zoöl.*, vol. x. p. 259, 1883].
Ophiomitra normani, n.sp. Obtained also at Stations 232 and 236.
Ophiomyces spathifer, n.sp. Obtained at no other locality.
Astroceras pergamena, n.g., n.sp. Obtained at no other locality. Only species of the genus.

Echinoidea (Agassiz, Zool. pt. 9).

Phormosoma hoplacantha, Wyville Thomson, n.sp. Two specimens; obtained also at Stations 164B and 300.
Echinus norvegicus, Düben and Koren. Obtained also at Stations 46, 47, 232, and 308.

Holothurioidea (Théel, Zool. pts. 13 and 39).

Lætmogone spongiosa, n.g., n.sp. One specimen; obtained at no other locality.
Pælopatides (?) *appendiculata*, n.g., n.sp. Three specimens; obtained at no other locality.

Annelida (M'Intosh, Zool. pt. 34).

Lætmonice aphroditoides, n.sp. One specimen; obtained at no other locality.
Polynoëlla levisetosa, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.
Hyalinœcia tubicola, Müller. One specimen; for distribution see Station VIII.

Cirripedia (Hoek, Zool. pt. 25).

Scalpellum japonicum, n.sp. One specimen; obtained at no other locality.

Isopoda.

One specimen, genus and species undetermined.

Macrura (Spence Bate, Zool. pt. 52).

Benthesicymus altus, n.g., n.sp. Four specimens; for distribution see Station 133.
Gennadas parvus, n.g., n.sp. One specimen; for distribution see Station 45.
Acanthephyra sica, n.sp. Two specimens; for distribution see Station 40.
Nematocarcinus tenuipes, n.sp. Six specimens; obtained also at Stations 218 and 232.
Notostomus japonicus, n.sp. One specimen; obtained at no other locality.

GASTEROPODA (Watson, Zool. pt. 42). STATION 235.

Bembix æola, n.g., n.sp. One specimen; obtained also at Station 232. Only species of the genus.

Turbo transenna, n.sp. One specimen; obtained at no other locality.

Echinella (?) *tectiformis*, n.sp. One specimen; obtained at no other locality.

FISHES (Günther, Zool. pt. 57).

Raja isotrachys, n.sp. One specimen; obtained at no other locality.

Cottus bathybius, n.sp. One specimen; obtained at no other locality.

Pteroidonus quinquarius, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Macrurus parallelus, n.sp. One specimen; obtained also at Stations 169, 170, 171, and 232.

,, *nasutus*, n.sp. Five specimens; obtained also at Station 232.

,, *altipinnis*, n.sp. Two specimens; obtained also at Station 237, 1875 fathoms.

,, *longifilis*, n.sp. One specimen; obtained at no other locality.

Sternoptyx diaphana (Herm.). One specimen; for distribution see Station 101.

Chauliodus sloanii, Bl. Schn. One specimen; obtained also at Stations 60, 104, 191, and 216A.

Halosaurus affinis, n.sp. Two specimens; obtained at no other locality. Recorded subsequently from Indian Ocean ("Investigator").

Synaphobranchus pinnatus (Gronovius). Four specimens; obtained also at Stations 125, 210, 214, and 232.

In addition to the foregoing, the following are recorded in the Station-book:—*Flabellum*, several Asterids besides *Hymenaster* (only one given above), *Cymothoa* on *Macrurus*, *Stylifer* (?) on *Hymenaster*.

Excluding Protozoa, over 120 specimens of invertebrates and fishes were obtained at this Station, belonging to about 55 species, of which 42 are new to science, including representatives of 14 new genera; 29 of the new species and 5 new genera were not obtained elsewhere.

Surface Organisms.—The following species are recorded from the surface at this Station:— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Quadrilonche platystaura, Haeckel.
Orophaspis ramosa, Haeckel.
Coscinaspis peripora, Haeckel.
Dorypelta dodecaspis, Haeckel.

Station 235.

Belonaspis lanceolata, Haeckel.
Microcubus cornutus, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Phormocampe mitra, Haeckel.
Auloceros furcosus, Haeckel.
Sagoplegma pyramidophora, Haeckel.
Medusetta quadrigata, Haeckel.
Gazelletta trispathilla, Haeckel.
Castanidium bethelli, Haeckel.
Castanissa crosbiei, Haeckel.
Cœlodendrum flabellatum, Haeckel.

In addition, the following are recorded in the note-books :—*Noctiluca* (abundant), *Pyrocystis noctiluca* (abundant), *Pyrocystis fusiformis* (a few), Diatoms, *Peridinium*, *Vorticella* (on Diatoms), pelagic Foraminifera, Medusæ, *Physalia*, *Sagitta*, Annelid larvæ, *Daphnia*, *Cypridina*, Copepods, Cirriped larvæ, *Phronima*, Hyperids, *Euphausia*, *Sergestes* larvæ, Zoëæ, *Atlanta*, *Pterotrachea*, Pteropods and larvæ, *Doliolum*, *Appendicularia*, *Salpa*. Several sharks were seen and one was caught, belonging to the usual species taken at sea (*Carcharias lamia*), and with one *Echeneis* attached.

Stations 236 and 236A.

Stations 236 and 236A (Soundings 337 and 338), off Japan (see Chart 35).

June 5, 1875 ; lat. 34° 58′ N., long. 139° 29′ E.
Temperature of air at noon, 64°·8 ; mean for the day, 65°·2.
Temperature of water :—

Surface,	66·5	270 fathoms,	47·2
70 fathoms,	60·0	370 „	42·2
170 „	52·2	Bottom (775 fathoms),	37·6

Depth, 775 and 420 fathoms; deposit, Green Mud, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 2 A.M. observed Omae Saki lighthouse on port bow, and at 6 A.M. observed land about Iro-o-Saki. At 1 P.M. stopped and sounded in 775 fathoms. At 2 P.M. put over trawl, veering 1000 fathoms. Obtained serial temperatures. Found on sounding at 3.15 P.M. that the ship had drifted into 420 fathoms. At 3.45 P.M. commenced heaving in trawl, which was hauled up very slowly and with great strain. At 4.45 P.M. trawl came up, considerably damaged, the net being torn in several places. The bag contained a quantity of stones and gravel, along with several specimens. At 5 P.M. proceeded towards Yokohama, anchoring there at 8.40 P.M.

The following species are recorded in the Zoological Reports from the trawl at this place :—

Stations 236 and 236A. Animals from Trawl.

Tetractinellida (Sollas, Zool. pt. 63).

Tetilla sp. (?). One specimen.

Pœcillastra tenuilaminaris, n.sp. Three specimens ; obtained at no other locality.

Corals (Moseley, Zool. pt. 7).

Cryptohelia pudica, M.-Edwards and Haime. Two specimens ; for distribution see Station 3.

Hydroida (Allman, Zool. pt. 20).

Cladocarpus formosus, Allman. Obtained at no other locality by the Challenger. Recorded from North Atlantic ("Porcupine").

Crinoidea (Carpenter, Zool. pt. 60).

Antedon alternata, n.sp. Four specimens ; obtained also at Stations 169, 170A, and 218.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha albata, n.sp. Obtained at no other locality.

Ophiomusium cancellatum, n.sp. Obtained also at Station 33 (?).

Ophiopholis japonica, n.sp. Obtained also at Station 235.

Amphiura bellis, n.sp. Obtained also at Stations 174 (var. ?) and 232.

„ *iris*, n.sp. Obtained at no other locality.

„ *glauca*, n.sp. Obtained also at Station 232.

Ophiacantha rosea, n.sp. Obtained also at Stations 145 and 308.

Ophiomitra normani, n.sp., (young). Obtained also at Stations 232 and 235.

Nemertea (Hubrecht, Zool. pt. 54).

Pelagonemertes rollestoni, Moseley, n.g., n.sp. One specimen (from surface ?) ; obtained also at Station 158.

Annelida (M'Intosh, Zool. pt. 34).

Thelepus marenzelleri, n.sp. One specimen ; obtained at no other locality.

Myzostomida (Graff, Zool. pt. 61).

Myzostoma cornutum, Graff. (On *Antedon alternata*).

Amphipoda (Stebbing, Zool. pt. 67).

Anonyx ampulloides, Spence Bate (Stimpson, MS.). One specimen ; obtained at no other locality by the Challenger. Recorded from Japan.

Macrura (Spence Bate, Zool. pt. 52).

Sergestes prehensilis, n.sp. One specimen ; obtained at no other locality.

Stations 236 and 236A.

Acanthephyra brachytelsonis, n.sp. One specimen; obtained also at Stations 170, 171, 194, 214, 232, and 318.

Pasiphæa amplidens, n.sp. One specimen; obtained at no other locality.

,, *acutifrons*, n.sp. One specimen; obtained also at Station 311, 245 fathoms.

Lamellibranchiata (Smith, Zool. pt. 35).

Lima goliath, Sowerby. One specimen; obtained also at Station 311, 245 fathoms.

In addition to the foregoing, the following are recorded in the Station-book:—*Aphrocallistes* (?), several specimens of *Isis*, *Onuphis* and another Annelid in tube (Terebellid ?), small *Scalpellum*, small *Coccia* and another Sternoptychid.

Excluding Protozoa, over 40 specimens of invertebrates were obtained in this trawling, belonging to about 29 species, of which 16 are new to science, including representatives of 2 new genera; 6 of the new species were not obtained elsewhere.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station:—

Radiolaria (Haeckel, Zool. pt. 40).

Actissa discoides, Haeckel.
Sphærozoum medusinum, Haeckel.
,, *polygonalis*, Haeckel.
Styptosphæra spumacea, Haeckel.
Drymosphæra polygonalis, Haeckel.
Cenellipsis circopora, Haeckel.
Heliosestrum liriope, Haeckel.
Spongasteriscus myelastrum, Haeckel.
Lonchostaurus bifurcus, Haeckel.
Lithoptera quadrata, Haeckel.
Ceriaspis cicatricosa, Haeckel.
Hexacolpus conifer, Haeckel.
Plectanium ovodimare, Haeckel.
Zygostephanium paradictyum, Haeckel.
Toxarium constrictum, Haeckel.
Parastephanus quadrispinus, Haeckel.
Dictyophimus brandtii, Haeckel.
Sethophormis umbrella, Haeckel.
Sethoconus trochus, Haeckel.
Corocalyptra margarethæ, Haeckel.
Theocampe cryptoprora, Haeckel.
Auloceros furcosus, Haeckel.
Sagoplegma pyramidophora, Haeckel.
Medusetta quadrigata, Haeckel.
Gazelletta trispathilla, Haeckel.
Castanidium bethelli, Haeckel.
Conchidium dimerella, Haeckel.
Cælodendrum flabellatum, Haeckel.

Tunicata (Herdman, Zool. pt. 76).

Salpa cordiformis-zonaria, Quoy and Gaimard—Pallas.

Animals from Japan.

The tow-nets procured much the same things as on the previous day (Station 235.)

The following species are recorded in the Zoological Reports as having been obtained during the stay of the Challenger in the neighbourhood of Japan, in shallow water, on shore, &c.:—

MONAXONIDA (Ridley and Dendy, Zool. pt. 59). JAPAN.

Halichondria panicea, Johnston. One specimen (pool at Oosima); obtained also at Kerguelen.

PENNATULIDA (Kölliker, Zool. pt. 2).

Pteroeides breviradiatum, Kölliker. Two specimens (Yokohama, 5 to 25 fathoms); obtained at no other locality by the Challenger.

ASTEROIDEA (Sladen, Zool. pt. 51).

Astropecten polyacanthus, Müller and Troschel. (Yokohama, 5 to 25 fathoms); for distribution see Port Jackson.

,, *japonicus*, Müller and Troschel. (Yokohama, 5 to 25 fathoms); obtained also at Stations 233, 233A, and 233B.

Luidia limbata, n.sp. (Yokohama, 5 to 25 fathoms); obtained at no other locality.

Asterina pectinifera (Müller and Troschel). (Yokohama, 5 to 25 fathoms); obtained at no other locality by the Challenger.

Asterias torquata, n.sp. (Yokohama, 5 to 25 fathoms); obtained at no other locality.

,, *amurensis*, Lütken. Several specimens (Yokohama, 5 to 25 fathoms); obtained at no other locality by the Challenger.

OPHIUROIDEA (Lyman, Zool. pt. 14).

Ophioglypha sinensis, Lyman. (Yokohama, 8 to 15 fathoms); obtained also at Station 233B.

ECHINOIDEA (Agassiz, Zool. pt. 9).

Temnopleurus hardwicki (Gray). (Yokohama, 5 to 25 fathoms); obtained also at Stations 192, 233, and Arafura Sea.

Astriclypeus manni, Verrill. (Singisima, Inland Sea); obtained at no other locality by the Challenger.

Schizaster japonicus, n.sp. (Yokohama, 8 to 14 fathoms); obtained also at Stations 188, 233, 233B, and Hong Kong.

HOLOTHURIOIDEA (Théel, Zool. pt. 39).

Cucumaria multipes, n.sp. One specimen (Yokohama, 8 to 10 fathoms); obtained at no other locality.

Stichopus japonicus, Selenka (?). One specimen (pools, Japan); obtained at no other locality by the Challenger. Recorded from Japan and Hong Kong.

,, ,, var. *typicus*, nov. Two specimens (Japan); obtained at no other locality.

JAPAN.

Holothuria minax, n.sp. One specimen (Japan, 8 to 14 fathoms); obtained at no other locality.

GEPHYREA (Selenka, Zool. pt. 36).

Echiurus unicinctus, Drasche. Twenty-one specimens (Inland Sea, from fishermen); obtained at no other locality by the Challenger. Recorded from Japan.

Dendrostoma blandum, Selenka and De Man. One specimen (Yokohama, 5 to 25 fathoms); obtained at no other locality by the Challenger. Recorded from Japan.

ANNELIDA (M'Intosh, Zool. pt. 34).

Lagisca yokohamiensis, n.sp. One specimen (Yokohama, 5 to 50 [?] fathoms); obtained at no other locality.

Lumbriconereis heteropoda, Marenzeller. One specimen (Yokohama, 5 to 25 fathoms); obtained also at Station 233.

Ammotrypane gracile, n.sp. One specimen (off Japan, 30 fathoms); obtained at no other locality.

STOMATOPODA (Brooks, Zool. pt. 45).

Squilla nepa, Latreille. Seven specimens (Yokoska, 5 to 25 fathoms); obtained also at Stations 233, 233B, and Sandwich Islands.

MACRURA (Spence Bate, Zool. pt. 52).

Penæus canaliculatus, Olivier, var. *japonicus*, nov. One specimen (Japan); the species obtained also at Port Jackson and Fiji.

,, *anchoralis*, n.sp. Six specimens (Yokohama, 5 to 20 fathoms); obtained also at Stations 188, 190, and Arrou Islands.

Crangon vulgaris, Fabricius. Three specimens (Yokoska, 5 to 20 fathoms); obtained at no other locality by the Challenger. Recorded from Europe.

Alpheus longimanus, n.sp. Four specimens (Yokoska, 5 to 20 fathoms); obtained also at Station 233.

ANOMURA (Henderson, Zool. pt. 69).

Cryptodromia japonica, n.sp. One specimen (Yokoska, 5 to 20 fathoms); obtained at no other locality.

Eupagurus constans, Stimpson. (Yokohama); obtained at no other locality by the Challenger. Recorded from Japan.

SOUNDINGS AND STATIONS
in the vicinity of
JAPAN
For explanation of abbreviations &c see Appendix 1.

134° 135° 136° 137° 138° 139° 140° 141°
36° 35° 34° 33°

Miako
Lake Biwa
Osaka
Kobe
50 mud
218 blue mud
Awaji Sima
Izumi Nada
Harima Nada
Iwo sima
Mitsuno Saki
Owary Bay
Matoya Hd
Sima
Iro sima Hd
Sino misaki
Omae saki
Fusi-Yama 12450 ft
Yedo
Yokohama
Inahoye saki
Kawatsu
Oosima
345 237 green mud
775 420 green mud
Vries I.
Rock I.
To-sima
Utone
Nii sima
Koon-sima
Miaki
Mikura
Kanawa
Fatsizio
565 green mud
237 1875 blue mud
Redfield Rk
One mile per hour May 1875.
Currents 4 miles per hour in June 1875.
234 2675 blue mud
Track of Challenger in June 1875.

134° Long East from Greenwich

Engraved by Malby & Sons

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BRACHYURA (Miers, Zool. pt. 49). JAPAN.

Pugettia incisa (De Haan). Two specimens (Yokoska, 10 fathoms); obtained at no other locality by the Challenger. Recorded from Japanese and Corean seas.

Thelphusa (*Geothelphusa*) *dehaanii*, White. Three specimens (near Kobé), two specimens (Hakona, 2500 feet above the sea), and one specimen (paddy fields near Lake Biwa); obtained at no other locality by the Challenger.

Pilumnoplax vestita (De Haan), var. *sexdentata*, Haswell. One specimen (Yokoska, 10 fathoms); obtained also at Station 233B.

Brachynotus (*Heterograpsus*) *penicillatus* (De Haan). Three specimens (Oosima, from pools); obtained at no other locality by the Challenger.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Raeta pulchella (Adams and Reeve). (Yokohama, 8 to 14 fathoms); obtained also at Station 233C.

SCAPHOPODA and GASTEROPODA (Watson, Zool. pt. 42).

Dentalium yokohamense, n.sp. (Yokohama, 8 to 14 fathoms); obtained at no other locality.

Acmæa dorsuosa (Gould) (?). One young specimen (Oosima); obtained at no other locality by the Challenger. Recorded from Japan.

„ *saccharina* (Linné). (Oosima); obtained at no other locality by the Challenger. Recorded from Philippines, Japan, Moluccas, Fiji, and Australia.

Trochus (*Monodonta*) *labio*, Linné. (Oosima); obtained also at Station 187.

„ (*Chlorostoma*) *xanthostigma* (Adams). (Oosima); obtained at no other locality by the Challenger. Recorded from Japan.

Purpura (*Thalessa*) *alveolata*, Reeve. (Oosima); obtained at no other locality by the Challenger. Recorded from Japan and Formosa.

Columbella versicolor, Sowerby. (Oosima); obtained at no other locality by the Challenger. Recorded from Indian and Pacific Oceans.

Cerithium carbonarium, Philippi. (Oosima); obtained at no other locality by the Challenger. Recorded from China and Philippines.

Bittium oosimense, n.sp. (Oosima); obtained at no other locality.

„ sp. (?). (Oosima).

Litorina (*Hamus*) *granularis*, Gray. (Oosima); obtained at no other locality by the Challenger. Recorded from New Zealand.

Japan.

Polyplacophora (Haddon, Zool. pt. 43).

Acanthopleura (?) *incana* (Gould). One specimen (Oosima); obtained also at Port Jackson.

Cephalopoda (Hoyle, Zool. pt. 44).

Octopus macropus, Risso. One specimen (Yokohama market); obtained at no other locality by the Challenger. A widely-distributed species.

Sepia esculenta, n.sp. Two specimens (Yokohama market); obtained at no other locality.

„ *andreanoides*, n.sp. Three specimens (Yokohama market); obtained at no other locality.

Sepiella maindroni, Rochebrune. One specimen (Inland Sea); obtained at no other locality by the Challenger. Recorded from Pondichery.

Loligo edulis, n.sp. One specimen (Yokohama market); obtained at no other locality.

„ *japonica*, Steenstrup, MS. One specimen (Yokohama market); obtained at no other locality by the Challenger.

Todarodes pacificus, Steenstrup. One specimen (Inland Sea); obtained at no other locality by the Challenger. Recorded from Japan.

Tunicata (Herdman, Zool. pt. 17).

Corella japonica, n.sp. Two specimens (Yokohama, shallow-water); obtained also at Station 233 and Hong Kong.

Fishes (Günther, Zool. pts. 6 and 57).

Trygon pastinaca, Linné. (Yokohama market); obtained also in Arafura Sea.

Myliobatis aquila, Linné. (Yokohama market); obtained at no other locality by the Challenger.

Percalabrax japonicus, C.V. (Inosima and Inland Sea—from fishing boats); obtained at no other locality by the Challenger.

Niphon spinosus, C.V. (Yokohama market); obtained at no other locality by the Challenger.

Serranus octocinctus, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

Apogon lineatus, Schlegel. (Inland Sea and Yokohama Bay, 15 fathoms); obtained also at Station 233.

Chætodon modestus, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

Upeneoides bensasi, Schlegel. (Yokohama market and Kobé); obtained at no other locality by the Challenger.

Pagrus major, Schlegel. (Oosima Harbour and Inosima—from fishing boats); obtained at no other locality by the Challenger. JAPAN.

,, *cardinalis*, Lac. (Yokohama market); obtained at no other locality by the Challenger.

Chrysophrys swinhonis, Günther. (Inland Sea and Yokohama market); obtained at no other locality by the Challenger.

Hoplegnathus fasciatus, Schlegel. (Inland Sea); obtained at no other locality by the Challenger.

Sebastes ventricosus, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

,, *oblongus*, n.sp. (Inland Sea and Yokohama market); obtained at no other locality.

,, *macrochir*, n.sp. (Inland Sea); obtained also at Station 232.

Scorpæna miostoma, n.sp. (Yokohama market); obtained at no other locality.

Pterois lunulata, Schlegel. (Yokohama market); obtained also in Arafura Sea.

Tetraroge longispinis, C.V., var. *nuda*, nov. (Kobé); the species obtained also at Station 203.

Sciæna sina, C.V. (Inland Sea); obtained at no other locality by the Challenger.

Prionurus scalprum, Langsd. (Yokohama market); obtained at no other locality by the Challenger.

Trachurus trachurus, Linné. (Yokohama market); obtained also at Valparaiso.

Caranx muroadsi, Schlegel. (Inland Sea); obtained at no other locality by the Challenger.

Equula nuchalis, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

Zeus japonicus, C.V. (Yokohama market); obtained at no other locality by the Challenger.

Cymbium niphonium, C.V. (Inland Sea); obtained at no other locality by the Challenger.

Brama raii, Bl. (Inosima, from fishing boats); obtained at no other locality by the Challenger.

Psenes anomalus, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

Percis sexfasciata, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

Uranoscopus asper, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

Sillago japonica, Schlegel. (Inland Sea); obtained at no other locality by the Challenger.

JAPAN.

Latilus argentatus, C.V. (Yokohama market); obtained at no other locality by the Challenger.

Lophius setigerus, Wahl. (Yokohama and Kobé); obtained at no other locality by the Challenger.

Platycephalus insidiator, Forsk. (Yokohama Bay and Inland Sea); obtained also at Queensland, Cape York, and Hong Kong.

„ *punctatus*, C.V. (Inland Sea); obtained at no other locality by the Challenger.

„ *rudis*, n.sp. (Yokohama market); obtained at no other locality.

Lepidotrigla microptera, Günther. (Inland Sea); obtained at no other locality by the Challenger.

Gobius yokohamæ, n.sp. (Inland Sea and Yokohama Bay, 15 fathoms); obtained at no other locality.

„ *hexanema*, Bleeker. (Inland Sea, Kobé, and Yokohama Bay, 15 fathoms); obtained at no other locality by the Challenger.

„ *flavimanus*, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

Callionymus lunatus, Schlegel. (Inland Sea, Kobé, and Yokohama Bay, 15 fathoms); obtained also at Port Jackson.

Chirus hexagrammus, Pall. (Inland Sea and Yokohama market); obtained at no other locality by the Challenger.

Agrammus schlegeli, Günther. (Yokohama market); obtained at no other locality by the Challenger.

Centronotus nebulosus, Schlegel. (Inland Sea and Yokohama market); obtained at no other locality by the Challenger.

Fistularia serrata, Cuv. (Yokohama); obtained at no other locality by the Challenger.

Platyglossus pœcilopterus, Schlegel. (Inland Sea and Yokohama market); obtained at no other locality by the Challenger.

„ *pyrrhogramma*, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

Pseudorhombus olivaceus, Schlegel. (Inland Sea); obtained at no other locality by the Challenger.

„ *pentophthalmus*, Günther. (Inland Sea); obtained at no other locality by the Challenger.

Pleuronectes variegatus, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

„ *yokohamæ*, n.sp. (Inland Sea and Yokohama Bay, 15 fathoms); obtained at no other locality.

Parophrys cornuta, Schlegel. (Inland Sea and Kobé); obtained at no other locality by the Challenger.

Cynoglossus interruptus, n.sp. (Yokohama market); obtained at no other locality.

Silurus asotus, Linné. (Lake Hakou); obtained at no other locality by the Challenger.

Saurida tumbil, Bl. (Inland Sea); obtained at no other locality by the Challenger.

Salmo macrostoma, n.sp. (Yokohama market); obtained at no other locality.

Aulopus japonicus, n.sp. (Yokohama market); obtained at no other locality.

Plecoglossus altivelis, Schlegel. (Tokaido); obtained at no other locality by the Challenger.

Salanx microdon, Bleeker. (Yokohama market); obtained at no other locality by the Challenger.

Hemirhamphus sajori, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

Cyprinus auratus, Linné. (Yokohama); obtained also at Hong Kong.

Leuciscus hakuensis, n.sp. (Lake Hakou); obtained at no other locality.

Achilognathus melanogaster, Bleeker. (Lake Biwa); obtained at no other locality by the Challenger.

Misgurnus anguillicaudatus, Cant. (Kiyoto); obtained at no other locality by the Challenger.

Engraulis japonica, Houttuyn. (Inland Sea and Kobé); obtained at no other locality by the Challenger.

Conger marginatus, Val. (Inland Sea); obtained also at Sandwich Islands.

Congromuræna anago, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

„ *megastoma*, n.sp. (Inosima, from fishing boats); obtained at no other locality.

Murænesox cinereus, Forsk. (Kobé); obtained at no other locality by the Challenger.

Tetrodon oblongus, Bl. (Inland Sea and Kobé); obtained at no other locality by the Challenger.

„ *pardalis*, Schlegel. (Yokohama market); obtained at no other locality by the Challenger.

„ *rubripes*, Schlegel. (Inland Sea and Yokohama market); obtained at no other locality by the Challenger.

Monocanthus septentrionalis, Günther. (Inland Sea); obtained at no other locality by the Challenger.

„ *modestus*, n.sp. (Inland Sea); obtained at no other locality.

„ *setifer*, Benn. (Yokohama market); obtained also at Cape Verdes.

Malacichthys griseus, Döderlein. Several specimens (Tokio—"great depths"); obtained at no other locality by the Challenger.

Japan.

Bathysebastes albescens, Steindachner and Döderlein. One specimen (Sea of Japan); obtained at no other locality by the Challenger.

Gonostoma microdon, n.sp. Two specimens (coast of Japan); for distribution see Station 23.

Harpodon microchir, n.sp. One specimen (Tokio); obtained at no other locality.

In the foregoing list 134 species are enumerated, of which 34 are new to science; 26 of the new species were not obtained elsewhere.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface in the harbours and shallow waters of Japan :—

Diatomaceæ.—The following species were observed by Mr. Comber in the surface gatherings from Yeddo Bay :—

Amphora quadrata, Gregory.
„ *proteus*, Gregory.
„ „ var. *minor*, Grunow.
„ *cymbifera*, Gregory.
„ *diducta*, A. Schmidt.
„ *lineolata*, Ehrenberg.
„ *ostrearia*, Brebisson.
Navicula distans, Ralfs.
„ *crassa*, Gregory.
„ *irrorata*, Greville, var. *elliptica*, Cleve.
„ *cluthensis*, Gregory, var. *minuta*, Cleve.
„ *lyra*, Ehrenberg, var. *elliptica*, A. Schmidt.
„ *coffeæformis*, A. Schmidt.
„ *suborbicularis*, Ralfs.
„ „ var. *forficula*, O'Meara.
„ *campylodiscus*, Grunow.
„ *smithii*, Brebisson.
„ *bombus*, Kutzing.
„ *weissflogii*, A. Schmidt.
„ *splendida*, Gregory.
„ *aspera*, Ehrenberg, and var.
„ *schmidtiana*, Grunow.
Schizonema smithii, Agardh.
Mastogloia meleagris, Grunow.
„ sp. (?).
Pleurosigma decorum, W. Smith.
„ *strigosum*, W. Smith.
„ *elongatum*, W. Smith.
„ *balticum*, W. Smith.
Amphiprora plicata, Gregory.
„ „ var. *japonica*, Castracane.
„ *alata*, Kutzing.
Amphiprora decussata, Grunow.
Cocconeis scutellum, Ehrenberg.
„ *costata*, Gregory.
„ *pseudo-marginata*, Gregory.
Nitzschia apiculata, Grunow, forma *minuta*.
„ *dubia*, W. Smith.
„ *pungens*, Grunow.
„ *socialis*, Gregory, var. *indica*, Castracane.
„ *sigma*, W. Smith.
Surirella fastuosa, Ehrenberg.
„ *præclara*, A. Schmidt.
Synedra fasciculata, Kutzing.
Thalassiothrix frauenfeldii, Grunow.
„ *nitzschioides*, Grunow (= *T. curvata*, Castracane).
Asterionella japonica, Cleve.
Grammatophora angulosa, Ehrenberg, var. *uncina*, Grunow.
„ sp. (?)
Actinocyclus moniliformis, Ralfs.
„ *ehrenbergii*, Ralfs.
„ *complanatus*, Castracane.
„ *ralfsii*, Ralfs.
„ „ var.
Actinoptychus undulatus, Ehrenberg.
„ *areolatus*, A. Schmidt.
„ *vulgaris*, Schumann, forma *spinulosa*.
Asteromphalus flabellatus, Greville.
„ *darwinii*, Ehrenberg, forma *oblonga*
Coscinodiscus excentricus, Ehrenberg.
„ *minor*, Ehrenberg.
„ *concavus*, Ehrenberg.

Coscinodiscus lineatus, Ehrenberg.
„ *curvatulus*, Grunow.
„ *normanni*, Gregory.
„ *subtilis*, Ehrenberg.
„ *kutzingii*, A. Schmidt.
„ *zonulatus*, Rattray.
„ *concinnus*, W. Smith.
„ *nodulifer*, Janisch.
„ *radiatus*, Ehrenberg.
„ *oculus-iridis*, Ehrenberg.
„ *asteromphalus*, Ehrenberg.
„ *decrescens*, Grunow.
„ *janischii*, A. Schmidt.
„ *entoleion*, Grunow.
„ *extravagans*, A. Schmidt.
„ *apiculatus*, Ehrenberg.
„ sp. (?).
Stephanopyxis turgida, Ralfs.
„ *palmeriana*, Grunow.
„ *turris*, Ralfs, var. *paucispina*, Grunow (= *S. campana*, Castracane).
Thalassiosira nordenskioldii, Cleve.
Melosira nummuloides, Agardh.
Pyxilla baltica, Grunow.
Paralia sulcata, Cleve.
Skeletonema costatum, Cleve.
Cyclotella striata, Grunow.

Biddulphia aurita, Brebisson. JAPAN.
„ *longicruris*, Greville, var. *japonica*, Grunow.
„ *reticulata*, Roper.
„ „ forma *subquadrata*.
„ *chinensis*, Greville.
Cerataulus turgidus, Ehrenberg.
Auliscus cœlatus, Bailey.
„ „ var. *strigillata*, A. Schmidt.
„ sp. (?).
Ditylum brightwellii, Grunow.
Hemiaulus chinensis, Greville.
Eucampia zodiacus, Ehrenberg, var. *nodosa*, Grunow.
Molleria cornuta, Cleve.
Lauderia annulata, Cleve.
Rhizosolenia shrubsolei, Cleve.
„ *setigera*, Brightwell.
„ *alata*, Brightwell.
Chætoceros peruvianum, Brightwell.
„ *distans*, Cleve.
„ *ralfsii*, Cleve.
„ *æquatoriale*, Cleve.
„ *protuberans*, Lauder.
„ *secundum*, Cleve.
„ *didymum*, Ehrenberg.
„ *compressum*, Lauder.
„ *sociale*, Lauder.
„ *pelagicum*, Cleve.

The following *fresh-water* species occurred :—

Pinnularia viridis, Ehrenberg.
Cymbella turgidula, A. Schmidt.
„ *cistula*, Hempricht.
Gomphonema acuminatum, Ehrenberg, var. *clavus*, Van Heurck.
Cocconeis placentula, Ehrenberg.
Epithemia gibba, Kutzing.
Synedra ulna, Ehrenberg.
Denticula tenuis, Kutzing.

COPEPODA (Brady, Zool. pt. 45).

Corycæus obtusus, Dana.

MACRURA (Spence Bate, Zool. pt. 52).

Thalassocaris stimpsoni, n.sp.

PTEROPODA (Pelseneer, Zool. pt. 65).

Cavolinia inflexa (Lesueur), young (= *Pleuropus pellucidus*).

In addition, the following are recorded in the note-books :—*Noctiluca*, Diatoms, *Peridinium tripos* and other species, Acanthometræ and other Radiolaria, Vorticellinæ and other Infusoria, Medusæ and larvæ, Siphonophoræ, *Cydippe* and other Ctenophoræ, Pluteus, Ophiurid and other Echinoderm larvæ, Rotifera, *Sagitta*, *Pilidium*, *Polygordius*

Japan. and other Annelid larvæ, Planarians and larvæ, *Evadne*, *Daphnia*, Copepods, Cirriped larvæ, Amphipods, Isopods, Zoëæ, small Gasteropods and Lamellibranchs, Cyphonautes, *Appendicularia*.

On April 13, in Yokohama Bay, the tow-nets came up crammed with masses of small Diatoms, in greater abundance than previously observed during the cruise, among which were noticed a few specimens of *Peridinium*, Infusorians, and Medusæ. On June 6, after the ship returned to Yokohama from a visit to the Inland Sea, there were relatively very few Diatoms in the surface tow-nets, which contained, however, immense numbers of small Acanthometræ, larvæ of *Membranipora*, small shells, *Peridinium*, Infusorians, Copepods, and Cirriped larvæ. *Noctiluca* was present in all the hauls of the tow-net in the bays and harbours of Japan.

Willemoes-Suhm writes: "I studied every day the development of *Polygordius*, from the larva of which I got the worm in a globe; I got also Cyphonautes, the larva of a *Membranipora*, and *Evadne*. Annelid larvæ were common, and so was a *Pluteus*, Cirriped larvæ (Nauplius and Cypris stages) were abundant, and next came Copepods, Zoëæ, and small shells with velum."

Station 237. **Station 237** (Sounding 379), Yokohama to Sandwich Islands (see Charts 35 and 36, and Diagram 17).

June 17, 1875.; lat. 34° 37′ N., long. 140° 32′ E.
Temperature of air at noon, 68°·8; mean for the day, 69°·5.
Temperature of water:—

	°		°
Surface,	73·0	250 fathoms,	48·0
10 fathoms,	73·4	275 ,,	46·0
20 ,,	72·0	300 ,,	44·1
30 ,,	70·5	400 ,,	40·8
40 ,,	69·0	500 ,,	38·8
50 ,,	67·5	600 ,,	37·7
60 ,,	66·1	700 ,,	37·0
70 ,,	65·0	800 ,,	36·6
80 ,,	64·0	900 ,,	36·4
90 ,,	63·2	1000 ,,	36·2
100 ,,	62·4	1100 ,,	36·0
125 ,,	59·8	1200 ,,	35·8
150 ,,	57·0	1300 ,,	35·6
175 ,,	54·5	1400 ,,	35·4
200 ,,	52·0	1500 ,,	35·3
225 ,,	50·0	Bottom,	35·3

Density at 60° F. at surface, 1·02570 ; bottom, 1·02555. Station 237.
Depth, 1875 fathoms ; deposit, Blue Mud, containing 4·45 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5 A.M. sounded in 1875 fathoms, about 40 miles S.E. of No Sima lighthouse. At 7 A.M. put trawl over. At 10 A.M. obtained serial temperatures down to 1500 fathoms. At noon commenced heaving in trawl, which came up at 2.40 P.M. with numerous specimens, a large quantity of mud, pumice-stones, large hardened blocks of the deposit, Cephalopod beak, vertebra of fish, and leaves of dicotylodonous trees. Surface current running at the rate of about 1½ knots per hour. At 3.15 P.M. completed temperatures, and made sail to a strong southerly breeze, which during the night increased to a gale. Black albatrosses, small petrel-like birds, and larger petrels were seen.

Distance at noon from Honolulu, Sandwich Islands, 3346 miles. Made good 41 miles. Amount of current 14 miles, direction N. 74° E.

The following species are recorded in the Zoological Reports from the trawl at this Station :— Animals from Trawl.

Alcyonaria (Wright and Studer, Zool. pt. 64).

Strophogorgia verrilli, n.g., n.sp. Obtained also at Station 235.
Dasygorgia japonica, n.sp. Obtained at no other locality.
Stenella dæderleini, n.sp. Several specimens ; obtained at no other locality.

Actiniaria (Hertwig, Zool. pts. 15 and 73).

Cereus spinosus, n.sp. Four specimens ; obtained also at Station 157.
Paractis (?) *tubulifera*, n.sp. Two specimens ; obtained at no other locality.
Porponia robusta, n.g., n.sp. One specimen ; obtained at no other locality. The only other species of the genus (*Porponia elongata*) was taken at Station 160.
Liponema multiporum, n.g., n.sp. One specimen ; obtained also at Stations 147 and 305. Only species of the genus.

Hydroida (Allman, Zool. pt. 70).

Monocaulus imperator, n.sp. Obtained also at Station 248, 2900 fathoms.

Asteroidea (Sladen, Zool. pt. 51).

Pararchaster semisquamatus, n.g., n.sp. Obtained also at Stations 44 or 45 (var.) and 235.
Porcellanaster tuberosus, n.g., n.sp. Obtained at no other locality.

Station 237.

Hyphalaster inermis, n.g., n.sp. Obtained at no other locality.
Psilaster gracilis, n.g., n.sp. Obtained at no other locality.
Brisinga armillata, n.sp. Obtained at no other locality.
Freycella pennata, n.sp. Obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha orbiculata, n.sp. Obtained at no other locality.
„ *sculptilis*, n.sp. Obtained at no other locality.
Ophiomusium granosum, n.sp. Obtained at no other locality.
Amphilepis tenuis, n.sp. Obtained at no other locality.

Echinoidea (Agassiz, Zool. pt. 9).

Phormosoma tenue, n.sp. Ten specimens; obtained also at Stations 272 and 274, 2600 and 2750 fathoms.

Holothurioidea (Théel, Zool. pt. 39).

Holothuria thomsoni, n.sp. Obtained also at Stations 158 (var.) and 244.

Cirripedia (Hoek, Zool. pt. 25).

Scalpellum vitreum, n.sp. One specimen; obtained at no other locality.

Isopoda (Beddard, Zool. pt. 48).

Eurycope fragilis, n.sp. Four specimens; obtained also at Stations 147, 152, and 158.

Schizopoda (Sars, Zool. pt. 37).

Eucopia australis, Dana. Three specimens; for distribution see Station 50.

Macrura (Spence Bate, Zool. pt. 52).

Aristeus armatus, n.sp. One specimen; obtained also at Stations 133, 184, 213, 246, 276, and 323.
Hepomadus glacialis, n.g., n.sp. One specimen; obtained at no other locality. The only other species of the genus (*Hepomadus inermis*) was taken at Station 289.
Gennadas parvus, n.g., n.sp. One specimen; for distribution see Station 45.
Glyphocrangon rimapes, n.sp. One specimen; obtained also at Stations 300 and 331.
Nematocarcinus longirostris, n.sp. Ten specimens; obtained at no other locality.
„ *proximatus*, n.sp. One specimen; obtained also at Stations 146, 188, 300, and 302.

Nematocarcinus productus, n.sp. One specimen ; obtained also at Stations 177 (?), 195, and 205. Station 237.

„ *parvidentatus*, n.sp. Nine specimens; obtained at no other locality.

Anomura (Henderson, Zool. pt. 69).

Parapagurus abyssorum, M.-Edwards, MS. Several specimens ; for distribution see Station 56.

Munidopsis subsquamosa, n.sp. Two specimens ; obtained also at Stations 146 and 302 (var.).

Brachyura (Miers, Zool. pt. 49).

Ethusa (*Ethusina*) *challengeri*, n.sp. One specimen ; obtained at no other locality.

Pycnogonida (Hoek, Zool. pt. 10).

Phoxichilidium mollissimum, n.sp. One specimen ; obtained at no other locality.

Lamellibranchiata (Smith, Zool. pt. 35).

Malletia dunkeri, n.sp. Obtained at no other locality.

Glomus japonicus, n.sp. Obtained at no other locality.

Arca (*Barbatia*) *pteroessa*, n.sp. Obtained also at Stations 16, 24, 71, 73, and 246.

Cuspidaria (*Myonera*) *lischkei*, n.sp. [See *Proc. Zool. Soc. Lond.*, 1891, p. 438].

Cephalopoda (Hoyle, Zool. pt. 44).

Octopus januarii, Steenstrup, MS. One specimen ; obtained also at Station 122.

Promachoteuthis megaptera, n.g., n.sp. One specimen ; obtained at no other locality. Only species of the genus.

Brachiopoda (Davidson, Zool. pt. 1).

Terebratula (or *Terebratulina* ?) *dalli*, n.sp. One specimen ; obtained at no other locality.

Discina atlantica, King. Several specimens ; for distribution see Station 106.

Fishes (Günther, Zool. pt. 57).

Neobythites grandis, n.sp. One specimen ; obtained at no other locality.

Macrurus asper, n.sp. One specimen ; obtained at no other locality.

„ *altipinnus*, n.sp. One specimen ; obtained also at Station 235.

„ *liocephalus*, n.sp. One specimen ; obtained also at Station 246, 2050 fathoms.

Station 237.

Gonostoma microdon, n.sp. Eight specimens; for distribution see Station 23.

Bathysaurus mollis, n.g., n.sp. One specimen; obtained also at Station 281, 2385 fathoms.

Notacanthus rissoanus, Filippi and Vérany. One specimen; obtained at no other locality by the Challenger. Recorded from Mediterranean.

Synaphobranchus bathybius, n.sp. Nine specimens; obtained also at Stations 146 and 246.

In addition to the foregoing, the following are recorded in the Station-book:—*Palythoa* on shells with *Pagurus*, two species of *Holothuria* (only one given above), two Annelids, two Lernæans on *Synaphobranchus*, *Cryptoniscus* on Caridid shrimp, three cuttlefishes (only two given above).

Excluding Protozoa, over 150 specimens of invertebrates and fishes were obtained at this Station, belonging to about 57 species, of which 45 are new to science, including representatives of 11 new genera; 25 of the new species and 1 new genus were not obtained elsewhere.

Organisms from the Deposit.

The following species of Foraminifera and Diatoms were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 33 per cent. of carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
„ „ var. *murrhyna*, Schwager.
„ „ var. *serrata*, Brady.
Spiroloculina tenuis (Czjzek).
Miliolina insignis, Brady.
„ *tricarinata* (d'Orbigny).
„ *trigonula* (Lamarck).
Ophthalmidium inconstans, Brady.
Planispirina celata (Costa).
„ *sigmoidea*, Brady.
Cornuspira involvens, Reuss.
Pelosina cylindrica, Brady.
Storthosphæra (?) sp.
Technitella legumen, Norman.
„ *melo*, Norman.
Bathysiphon filiformis, Sars.
Psammosphæra fusca, Schulze.
Jaculella obtusa, Brady.
Hyperammina ramosa, Brady.
„ *subnodosa*, Brady (?).
Marsipella cylindrica, Brady.
Rhabdammina abyssorum, Sars.
„ *linearis*, Brady.
Aschemonella catenata (Norman).
Rhizammina algæformis, Brady.
Reophax adunca, Brady.
„ *cylindrica*, Brady (?).
„ *dentaliniformis*, Brady.
„ *difflugiformis*, Brady.
„ *distans*, Brady.
„ *guttifera*, Brady.
„ *membranacea*, Brady (?).
„ *nodulosa*, Brady.
„ *pilulifera*, Brady.
„ *scorpiurus*, Montfort.
„ *spiculifera*, Brady (?).
Haplophragmium anceps, Brady.
„ *canariense* (d'Orbigny).
„ *globigeriniforme* (Parker and Jones).
„ *glomeratum*, Brady.

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Haplophragmium latidorsatum (Bornemann).
,, *nanum*, Brady (?).
,, *rotulatum*, Brady.
Thurammina papillata, Brady.
Hormosina globulifera, Brady.
,, *ovicula*, Brady.
Ammodiscus charoides (Jones and Parker).
,, *gordialis* (Jones and Parker).
,, *tenuis*, Brady.
Trochammina galeata, Brady.
,, *inflata* (Montagu).
,, *pauciloculata*, Brady.
,, *ringens*, Brady.
,, *trullissata*, Brady.
Webbina clavata, Jones and Parker.
Cyclammina cancellata, Brady.
,, *pusilla*, Brady.
Textularia agglutinans, d'Orbigny.
,, *quadrilatera*, Schwager.
Gaudryina baccata, Schwager.
,, *pupoides*, d'Orbigny.
,, *siphonella*, Reuss.
Clavulina parisiensis, d'Orbigny (?).
Bulimina aculeata, d'Orbigny.
,, *buchiana*, d'Orbigny.
,, *inflata*, Seguenza.
,, *ovata*, d'Orbigny.
,, *pyrula*, d'Orbigny.
,, *subteres*, Brady.
Virgulina subsquamosa, Egger.
Bolivina textilarioides, Reuss.
Cassidulina subglobosa, Brady.
Chilostomella ovoidea, Reuss.
Lagena acuticosta, Reuss.
,, *apiculata*, Reuss.
,, *aspera*, Reuss.
,, *elongata* (Ehrenberg).
,, *exsculpta*, Brady.
,, *globosa* (Montagu).
,, *gracillima* (Seguenza).
Lagena lævigata (Reuss).
,, *lævis* (Montagu).
,, *lineata* (Williamson) (?).
,, *marginata* (Walker and Jacob).
,, *orbignyana* (Seguenza).
,, *quadricostulata*, Reuss (?).
,, *squamosa* (Montagu).
,, *staphyllearia* (Schwager).
,, *striata* (d'Orbigny).
,, *sulcata* (Walker and Jacob).
,, sp. (?).
Nodosaria communis, d'Orbigny.
Cristellaria reniformis, d'Orbigny.
Uvigerina tenuistriata, Reuss.
× *Globigerina æquilateralis*, Brady.
× ,, *bulloides*, d'Orbigny.
× ,, ,, var. *triloba*, Reuss.
× ,, *conglobata*, Brady.
× ,, *dubia*, Egger.
× ,, *rubra*, d'Orbigny.
× ,, *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Pullenia obliquiloculata*, Parker and Jones.
,, *quinqueloba*, Reuss.
,, *sphæroides* (d'Orbigny).
Sphæroidina bulloides, d'Orbigny.
× ,, *dehiscens*, Parker and Jones.
Truncatulina lobatula (Walker and Jacob).
,, *variabilis*, d'Orbigny.
× *Pulvinulina canariensis* (d'Orbigny).
× ,, *crassa* (d'Orbigny).
,, *elegans* (d'Orbigny).
,, *favus*, Brady.
× ,, *menardii* (d'Orbigny).
× ,, *micheliniana* (d'Orbigny).
× ,, *patagonica* (d'Orbigny).
Rotalia soldanii, d'Orbigny.
Nonionina pompilioides (Fichtel and Moll).
,, *umbilicatula* (Montagu).

Diatomaceæ.—The following species of Diatoms were observed by Mr. Comber and Mr. Rattray.

Amphora quadrata, Gregory.
,, *salina*, W. Smith, var.
Cymbella gastroides, Kutzing (fresh water).
,, *ehrenbergii*, Kutzing (fresh water).
Navicula lyra, Ehrenberg.
,, ,, var. *elliptica*, A. Schmidt.
Navicula hennedyii, Smith.
,, *oblonga*, Kutzing (fresh water).
,, *crabro*, Kutzing.
,, *legumen*, Ehrenberg, var. *decrescens*, Grunow (?), (fresh water).
,, *nebulosa*, Gregory.

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Navicula spectabilis, Gregory.
,, *smithii*, Brebisson.
,, *nitescens*, Ralfs.
,, *prætexta*, Ehrenberg.
,, *constricta*, Grunow.
,, *gemmata*, Greville.
,, *multicostata*, Grunow.
,, *splendida*, Gregory.
,, *notabilis*, Greville.
,, *aspera*, Ehrenberg.
Alloioneis antillarum, Cleve and Grunow.
,, *debyii*, forma *osculifera* (= *Trachyneis*, Cleve).
,, *peragalli*, Brun.
,, *monodon*, Brun.
Pleurosigma affine, Grunow, var. *normanni*, Ralfs.
Cocconeis pellucida, Hantzsch.
Orthoneis splendida, Grunow.
Campyloneis grevillei, Grunow.
Nitzschia jelinekii, Grunow.
,, *marina*, Grunow.
Surirella recedens, A. Schmidt.
,, *lata*, W. Smith.
,, *fastuosa*, Ehrenberg.
,, ,, var. *suborbicularis*, A. Schmidt.
,, *slesvicensis*, Grunow (fresh water).
,, *ocellata*, Castracane.
Campylodiscus echeneis, Ehrenberg.
,, *hypodromus*, Tempère and Brun.
,, *horologium*, Williamson, var.
,, *dentatus*, Deby.
,, *undulatus*, Greville (= *C. brightwellii*, Grunow).
,, *tæniatus*, A. Schmidt.
Rhaphoneis surirella, Ehrenberg, var. *australis*, Petit.
Synedra superba, Kutzing.
,, *gaillionii*, Ehrenberg.
,, *doliolus*, Wallich.
Grammatophora undulata, Ehrenberg, var. *japonica*, Grunow.
,, *stricta*, Ehrenberg.
,, *ovalauensis*, Grunow.
,, *marina*, Kutzing, var. *tropica*, Grunow.
Glyphodesmis williamsonii, Grunow.
Rhabdonema adriaticum, Kutzing.
,, *arcuatum*, Kutzing.
Gephyria media, Arnott.
Roperia tesellata, Grunow.
Actinocyclus complanatus, Castracane.
Actinocyclus japonicus, Castracane.
,, *punctulatus*, Castracane.
,, *rotula*, Castracane.
Actinoptychus subangulatus, A. Schmidt.
,, *undulatus*, Ehrenberg.
,, *areolatus*, A. Schmidt.
,, *vulgaris*, Schumann.
,, *splendens*, Ralfs.
Asteromphalus brookei, Bailey.
,, *humboldtii*, Ehrenberg.
,, *roperianus*, Ralfs.
,, *hookerii*, Ehrenberg.
,, *hiltonianus*, Ralfs.
,, *arachne*, Ralfs.
Coscinodiscus lineatus, Ehrenberg.
,, *anguste-lineatus*, A. Schmidt.
,, *leptopus*, Janisch.
,, *excentricus*, Ehrenberg.
,, ,, var. *punctifera*, Grunow.
,, *curvatulus*, Grunow.
,, ,, var. *recta*, Rattray.
,, *marginatus*, Ehrenberg.
,, *fimbriato-limbatus*, Ehrenberg.
,, *subtilis*, Ehrenberg.
,, *concinnus*, Smith, var. *jonesiana*, Rattray.
,, *radiatus*, Ehrenberg.
,, ,, var. *media*, Grunow.
,, *obscurus*, A. Schmidt.
,, ,, var. *floralis*, Brun.
,, *oculus-iridis*, Ehrenberg.
,, ,, var. *loculifera*, Rattray.
,, *argus*, Ehrenberg.
,, *borealis*, Bailey.
,, *asteromphalus*, Ehrenberg, var.
,, *rex*, Wallich.
,, *gazellæ*, Janisch.
,, *nitidus*, Gregory.
,, *radiosus*, Grunow.
,, *nodulifer*, Janisch.
,, *obovatus*, Castracane.
,, *robustus*, Greville.
,, *decrescens*, Grunow.
,, *convexus*, A. Schmidt.
,, *africanus*, Janisch.
,, *apiculatus*, Ehrenberg.
,, *gigas*, Ehrenberg, var. *diorama*, Grunow.
,, *janischii*, A. Schmidt.
,, sp. (?).
Ethmodiscus sp. (?).

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Paralia sulcata, Cleve.
Melosira mediterranea, Grunow, var. *punctulata*, Brun.
„ *solida*, Eulenstein.
„ *clavigera*, Grunow.
Podosira hormoides, Kutzing.
„ *lævis*, Gregory.
„ *maxima*, Grunow.
Cyclotella striata, Grunow, var. *intermedia*, Grunow.
Arachnoidiscus ehrenbergii, Harvey and Bailey.
„ *japonicus*, Ehrenberg.
„ *ornatus*, Ehrenberg.
„ „ var. (near var. *montereyana*, but with the transverse costæ more regular, and near *Arachnoidiscus grevilleanus*, Hardman).
Stictodiscus californicus, Greville.
„ „ var. *nankoorensis*, Grunow.
„ „ var. *areolata*, Grunow.
„ „ var. *ecostata*, Grunow.
„ *varians*, Castracane.
„ *parallelus*, A. Schmidt, forma *tetragona*.
Auliscus sculptus, Ralfs.
„ *cœlatus*, Bailey.
Cerataulus turgidus, Ehrenberg.
Biddulphia pulchella, Gray.
„ *reticulata*, Roper.
„ *tridentata*, Ehrenberg.
„ *rhombus*, Smith.
„ *aurita*, Brebisson.
Anaulus minutus, Grunow.
Isthmia nervosa, Kutzing.
Euodia janischii, Grunow.
Hemidiscus cuneiformis, Wallich.
Triceratium favus, Ehrenberg.
„ *fimbriatum*, Wallich.
Triceratium formosum, Brightwell.
„ *armatum*, Roper.
„ *grande*, Brightwell.
„ *distinctum*, Janisch.
„ *arcticum*, Brightwell, var. *permagna*, Rattray, MS.
„ „ var. *californica*, Grunow.
„ „ var. *japonica*, A. Schmidt.
„ *calvescens*, Castracane.
„ *tumescens*, Castracane.
„ *rivale*, A. Schmidt.
„ *grunovii*, Janisch (= *T. ferox*, Castracane).
„ *scitulum*, Brightwell.
„ *quadrangulare*, Greville.
„ *cuspidatum*, Janisch.
„ *americanum*, Ralfs (= *T. amblyoceros*, Brightwell).
Chætoceros coarctatum, Lauder.
Goniothecium sp. (?).
Craspedodiscus coscinodiscus, Ehrenberg.
Asterolampra marylandica, Ehrenberg.
Hyalodiscus subtilis, Bailey.
„ *stelliger*, Bailey.
Bacteriastrum varians, Lauder.
Rhizosolenia sp. (?).
Gomphonema geminatum, Agardh (fresh water).
Striatella unipunctata, Agardh.
Stauroneis phœnicenteron, Ehrenberg (fresh water).
Epithemia turgida, Kutzing, var. *granulata*, Cleve (fresh water).
„ *gibba*, Kutzing (fresh water).
„ *argus*, Smith, var. *amphicephala*, Grunow (= *E. alpestris*, W. Smith), (fresh water).
Podocystis adriatica, Bailey.

Organisms from Surface-Nets.

Surface Organisms—The following species are recorded from the surface in the neighbourhood of this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Cromyechinus polyacanthus, Haeckel.
Panartus fusiformis, Haeckel.
Desmocampe catenula, Haeckel.
Myelastrum anomalum, Haeckel.
Pylodiscus sexangularis, Haeckel.
Rhopalodictyum bifidum, Haeckel.
Sethophormis umbrella, Haeckel.
Sethoconus trochus, Haeckel.
Pterocorys columba, Haeckel.
Theocampe cryptoprora, Haeckel.
Auloceros furcosus, Haeckel.
Sagoplegma pyramidophora, Haeckel.
Auloplegma perplexum, Haeckel.

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Medusetta quadrigata, Haeckel.
Gazelletta trispathilla, Haeckel.
Castanidium bethelli, Haeckel.
Cœlodendrum flabellatum, Haeckel.

Copepoda (Brady, Zool. pt. 23).

Eucalanus setiger, n.sp.
Scolecithrix danæ (Lubbock).
Euchæta prestandreæ, Philippi.
Candace pectinata, Brady.
Oncæa obtusa (Dana).

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *acicula* (Rang).

Tunicata (Herdman, Zool. pt. 76).

Doliolum affine, n.sp.
„ *challengeri*, n.sp.

Fishes (Günther, Zool. pt. 78).

Thyrsites prometheus, C.V.

In addition, the following are recorded in the note-books :—*Noctiluca*, *Pyrocystis*, *Peridinium* (*Ceratium*), *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina*, Medusæ, Siphonophoræ, Ctenophoræ, *Sagitta*, *Alciopa*, tubicolous and other Annelids and larvæ, *Daphnia*, *Cypridina*, *Saphirina*, Cirriped larvæ, *Euphausia*, *Lucifer*, small Lamellibranchs and Gasteropods, *Atlanta*, many Pteropods and larvæ, small cuttle-fish, *Appendicularia*, and several small fishes.

Station 238.

Station 238 (Sounding 380), Yokohama to Sandwich Islands (see Chart 36 and Diagram 17).

June 18, 1875 ; lat. 35° 18′ N., long. 144° 8′ E.
Temperature of air at noon, 72°·8 ; mean for the day, 72°·7.
Temperature of water :—

Surface,	70·5	250 fathoms,	48·8
10 fathoms,	69·6	275 „	47·1
20 „	68·7	300 „	45·9
30 „	67·8	400 „	42·2
40 „	66·9	500 „	39·7
50 „	66·0	600 „	38·3
60 „	65·1	700 „	37·5
70 „	64·2	800 „	37·0
80 „	63·3	900 „	36·6
90 „	62·4	1000 „	36·4
100 „	61·5	1100 „	36·2
125 „	59·3	1200 „	36·0
150 „	57·0	1300 „	35·7
175 „	54·9	1400 „	35·5
200 „	52·7	1500 „	35·3
225 „	50·7	Bottom,	35·0

Density at 60° F. at bottom, 1·02558. STATION 238.

Depth, 3950 fathoms; deposit, Red Clay, containing no carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 11.45 A.M. shortened and furled sails, and proceeded under steam. At 1 P.M. sounded in 3950 fathoms. Obtained serial temperatures down to 1500 fathoms. At 4.30 P.M. completed temperatures and made sail. Black albatrosses and a small prion-like bird were seen.

Distance at noon from Honolulu, 3170 miles. Made good 172 miles. Amount of current 35 miles, direction N. 9° E,

The following species of Foraminifera and Radiolaria were observed in the deposit from this Station, in which there was no trace of the bluish-coloured mud, nor of the glauconitic particles characteristic of all the deposits nearer the coast of Japan (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :— ORGANISMS FROM THE DEPOSIT.

FORAMINIFERA (Brady, Zool. pt. 22).

Miliolina labiosa (d'Orbigny).
Reophax dentaliniformis, Brady.
„ *difflugiformis*, Brady.
„ *membranacea*, Brady.
„ *nodulosa*, Brady.
„ *scorpiurus*, Montfort,
Haplophragmium canariense (d'Orbigny).
„ *globigeriniforme* (Parker and Jones).
Haplophragmium latidorsatum (Bornemann).
„ *tenuimargo*, Brady.
Hormosina ovicula, Brady.
Ammodiscus shoneanus, Siddall.
Trochammina coronata, Brady (?).
„ *pauciloculata*, Brady.
„ *trullissata*, Brady.
Gaudryina siphonella, Reuss.

RADIOLARIA (Haeckel, Zool. pt. 40).

Clathrosphæra circumtexta, Haeckel.
Challengeron bethelli, Murray.

Surface Organisms.—The following species are recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Xiphoptera tessaractena, Haeckel.
Hystrichaspis serrata, Haeckel.
Phractopelta tessaraspis, Haeckel.
Plectophora triomma, Haeckel.
Plectaniscus tripodiscus, Haeckel.
Sethophormis umbrella, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Auloceros furcosus, Haeckel.
Sagoplegma pyramidophora, Haeckel.
Gazelletta trispathilla, Haeckel.
Castanidium bethelli, Haeckel.
Cælodendrum flabellatum, Haeckel.

TUNICATA (Herdman, Zool. pt. 76).

Doliolum challengeri, n.sp.

In addition, the following are recorded in the note-books :—*Noctiluca*, *Pyrocystis* (two varieties), *Peridinium tripos* (*in catena*) and other species, Diatoms, *Globigerina*, *Orbulina*, *Hastigerina*, *Pullenia*, and other Foraminifera, *Vorticella* on Diatoms, Medusæ, *Porpita* and other Siphonophoræ, young Ophiurids, Echinoderm larvæ, *Sagitta*,

Station 238. *Alciopa* and other Annelids, *Saphirina* and other Copepods, Cirriped larvæ, *Squilla* larvæ, *Euphausia*, *Lucifer*, *Atlanta*, Pteropods and other small shells, *Salpa*, *Appendicularia*. The hauls of the tow-net from the surface were quite oceanic in character, but in a haul from 30 fathoms there were many Diatoms, *Noctiluca*, and *Peridinium*, which indicated that the influence of the Japan Stream in transporting brackish-water organisms extended thus far; in a haul from 60 fathoms there were immense numbers of *Doliolum* and small blue *Salpæ*. The absence of *Daphnia*, always present near Japan and abundant on the previous day, was noticeable.

Station 239. **Station 239** (Sounding 381), Yokohama to Sandwich Islands (see Chart 36 and Diagram 17).

June 19, 1875; lat. 35° 18′ N., long. 147° 9′ E.
Temperature of air at noon, 72°·5; mean for the day, 72°·0.
Temperature of water:—

	°		°
Surface,	70·2	400 fathoms,	41·6
25 fathoms,	68·1	500 „	39·0
50 „	64·1	600 „	38·1
75 „	63·4	700 „	37·7
100 „	62·3	800 „	37·4
125 „	60·8	900 „	37·1
150 „	59·1	1000 „	36·9
175 „	57·1	1100 „	36·7
200 „	55·1	1200 „	36·4
225 „	53·2	1300 „	36·1
250 „	51·3	1400 „	35·9
275 „	49·5	1500 „	35·7
300 „	47·7	Bottom,	35·1

Density at 60° F.:—

Surface,	1·02577	200 fathoms,	1·02560
50 fathoms,	1·02585	400 „	1·02526
100 „	1·02575	Bottom,	1·02572

Depth, 3625 fathoms; deposit, Red Clay, containing no carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 8.10 A.M. got up steam, shortened and furled sails, and proceeded under steam. At 10 A.M. sounded in 3625 fathoms. At 1 P.M. obtained serial temperatures down to 1500 fathoms. At 3.30 P.M. completed temperatures and made sail.

Distance at noon from Honolulu, 3011 miles. Made good 157 miles. Amount of current for past two days 35 miles, direction N. 9° E.

Surface Organisms.—The following species are recorded from the surface at this Station :— Station 239. Organisms from Surface-Nets.

Radiolaria (Haeckel, Zool. pt. 40).

Sphærozoum armatum, Haeckel.
Xiphacantha platyptera, Haeckel.
Orophaspis astrolonche, Haeckel.
,, *tessaraspis*, Haeckel.
Phractopelta doratáspis, Haeckel.
Dorypelta lithoptera, Haeckel.
Sethophormis umbrella, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Auloceros furcosus, Haeckel.
Sagoplegma pyramidophora, Haeckel.
Aulosphæra bifurca, Haeckel.
Medusetta craspedota, Haeckel.
Castanidium bethelli, Haeckel.
Cœlodendrum flabellatum, Haeckel.

Tunicata (Herdman, Zool. pt. 76).

Doliolum challengeri, n.sp.

In addition, the following are recorded in the note-books:—Diatoms (very few), *Pyrocystis*, *Globigerina*, *Orbulina*, *Hastigerina*, *Pullenia*, and other Foraminifera (abundant), Siphonophoræ, *Sagitta*, *Saphirina* and other Copepods, *Phronima*, Hyperids, *Euphausia*, *Lucifer*, *Sergestes* larvæ, Pteropods and other small shells, *Appendicularia*, small fishes. The absence of *Noctiluca*, *Daphnia*, brackish-water Diatoms, and the larvæ of shallow-water organisms, indicated that the ship had again entered truly pelagic waters.

Station 240 (Sounding 382), Yokohama to Sandwich Islands (see Chart 36 and Diagram 17). Station 240.

June 21, 1875 ; lat. 35° 20′ N., long. 153° 39′ E.
Temperature of air at noon, 67°·3 ; mean for the day, 68°·4.
Temperature of water:—

	°		°
Surface,	64·8	225 fathoms,	40·1
10 fathoms,	61·5	250 ,,	40·0
20 ,,	58·5	275 ,,	40·0
30 ,,	56·0	300 ,,	39·6
40 ,,	54·2	400 ,,	38·2
50 ,,	52·4	500 ,,	37·4
60 ,,	51·0	600 ,,	36·9
70 ,,	49·6	700 ,,	36·4
80 ,,	48·3	800 ,,	36·3
90 ,,	47·0	900 ,,	36·2
100 ,,	45·8	1000 ,,	36·0
115 ,,	44·0	1100 ,,	35·9
125 ,,	43·2	1200 ,,	35·7
130 ,,	42·8	1300 ,,	35·5
150 ,,	41·4	1400 ,,	35·3
175 ,,	40·6	1500 ,,	35·1
200 ,,	40·2	Bottom,	34·9

Station 240.

Density at 60° F.:—

Surface,	1·02556	200 fathoms,	1·02504
25 fathoms,	1·02558	300 „	1·02520
50 „	1·02544	400 „	1·02504
100 „	1·02535		

Depth, 2900 fathoms; deposit, Red Clay, containing no carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 3.15 A. M. shortened and furled sails, and got up steam to sound and trawl. At 5 A.M. put trawl over, veering 4000 fathoms. At 6 A.M. proceeded under steam. At 7 A.M. sounded in 2900 fathoms. At 9 A.M. obtained serial temperatures down to 1500 fathoms. At 3 P.M. commenced heaving in trawl, but at 4.30 P.M. the trawl-rope carried away. Made sail. Black albatrosses, black and white petrels, and black prion-like birds were seen.

Distance at noon from Honolulu, 2681 miles. Made good 139 miles. Amount of current 19 miles, direction N. 83° E.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Cladococcus japonicus, Haeckel.
Elatomma scoparium, Haeckel.
Actinomma japonicum, Haeckel.
Panartus spinosus, Haeckel.
Amphirrhopalum ximorphum, Haeckel.
Hystrichaspis cristata, Haeckel.
Hexalaspis sexalata, Haeckel.
Plagonium lampoxanthium, Haeckel.
Dictyophimus gracilipes, Bailey.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Auloceros furcosus, Haeckel.
Sagoscena cruciarum, Haeckel.
Sagmidium crucicorne, Haeckel.
Aulosphæra trifurca, Haeckel.
Castanella balfouri, Haeckel.
Castanidium bethelli, Haeckel.
Cælodendrum flabellatum, Haeckel.

Amphipoda (Stebbing, Zool. pt. 67).

Parathemisto pacifica, n.sp.
Streetsia challengeri, n.g., n.sp.

Pteropoda (Pelseneer, Zool. pt. 58).

Pneumonoderma pacificum, Dall.

In addition, the following are recorded in the note-books :—*Ethmodiscus* and other Diatoms, *Pyrocystis* (some of them having four nuclei), *Peridinium tripos* and other species (very few), *Globigerina*, *Orbulina*, *Hastigerina*, *Pullenia*, and *Pulvinulina*, *Velella*, *Porpita*, young Ophiurids, *Sagitta*, *Cypridina*, *Saphirina* and other Copepods, Hyperids, *Phronima*, *Primno*, *Oxycephalus*, *Euphausia*, Dohrn's Zoëa, *Halobates*, small

shells, *Glaucus*, *Doliolum*, *Salpa*, *Appendicularia*. The ship passed through red and white-coloured patches of water, and about the same time a great change was noticed in the temperature of the surface water, which fell from 22° to 18° C.; the patches were so noticeable that the hand lead was cast to see if there were not a shoal. The discoloration seemed to be due to Copepods, some of which were of a bright red colour, similar to what was observed in the Southern Indian Ocean, while others belonging to a different species were quite pale, and many of them dead. Station 240.

Willemoes-Suhm writes: "The surface abounded with *Hyperia*, as on the passage from Bermuda to Halifax. I found a minute Zoëa, notable for the insertion of the eyes deeply into the carapace, which has been figured by Dohrn from the Indian Ocean; after a careful search I failed to find any further specimens."

June 22, 1875.

Strong southerly breeze during the night and early morning. At 3 A.M. shortened sail, and at 4 A.M. put over trawl with two tow-nets attached. When about 1900 fathoms had been veered, the trawl-rope fouled the screw and parted, the trawl and line being lost. In the evening it became calm and many Copepods and specimens of *Doliolum* were obtained in the surface-nets.

Distance at noon from Honolulu, 2543 miles. Made good 140 miles. Amount of current 20 miles, direction N. 32° E.

Station 241 (Sounding 383), Yokohama to Sandwich Islands (see Chart 36 and Diagram 17). Station 241.

June 23, 1875; lat. 35° 41′ N., long. 157° 42′ E.

Temperature of air at noon, 70°·3; mean for the day, 69°·8.

Temperature of water:—

Surface,	69°·2	400 fathoms,	39°·8
25 fathoms,	64·7	500 „	38·4
50 „	62·5	600 „	37·7
75 „	60·8	700 „	37·2
100 „	59·3	800 „	36·9
125 „	57·5	900 „	36·6
150 „	55·5	1000 „	36·3
175 „	53·1	1100 „	36·0
200 „	50·7	1200 „	35·7
225 „	48·7	1300 „	35·4
250 „	46·3	1400 „	35·1
275 „	44·0	1500 „	35·1
300 „	42·4	Bottom,	35·1

Station 241.

Density at 60° F. :—

Surface,	1·02574	300 fathoms,	1·02575
50 fathoms,	1·02574	400 „	1·02575
100 „	1·02567	900 „	1·02561
200 „	1·02573	Bottom,	1·02558

Depth, 2300 fathoms; deposit, Red Clay, containing 17·29 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 3 A.M. shortened and furled sails. At 4 A.M. got up steam. At 4.30 A.M. put over trawl, veering 4000 fathoms. At 6 A.M. proceeded under steam. At 6.30 A.M. sounded in 2300 fathoms. At 8 A.M. shortened in trawl-rope to 3000 fathoms. At 10 A.M. obtained serial temperatures down to 1500 fathoms. At 2 P.M. commenced heaving in trawl, which came up at 4.40 P.M. with numerous specimens and many pumice-stones with animals attached to them. The two tow-nets attached to the beam of the trawl were filled with clay. At 4.45 P.M. made sail.

Distance at noon from Honolulu, 2484 miles. Made good 61 miles. Amount of current 20 miles, direction N. 17° E.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Deep-Sea Keratosa (Haeckel, Zool. pt. 82).

Psammophyllum flustraceum, n.g., n.sp. One specimen; obtained at no other locality.

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Axinella profunda, n.sp. One specimen; obtained also at Station 281, 2385 fathoms.

Hexactinellida (Schulze, Zool. pt. 53).

Caulophacus elegans, n.g., n.sp. Three specimens; obtained at no other locality.

Bathydorus fimbriatus, n.g., n.sp. One specimen; obtained also at Station 248, 2900 fathoms.

Hyalonema robustum, n.sp. One specimen; obtained at no other locality.

„ sp. (?).

Alcyonaria (Wright and Studer, Zool. pt. 64).

Bathygorgia profunda, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Pennatulida (Kölliker, Zool. pt. 2).

Scleroptilum grandiflorum, n.g., n.sp. Three specimens; obtained at no other locality.

ACTINIARIA (Hertwig, Zool. pts. 15 and 73). STATION 241.

Amphianthus bathybium, n.g., n.sp. One specimen; obtained at no other locality.

„ *ornatum*, n.g., n.sp. Three specimens; obtained also at Stations 56 and 244. These are the only two species of the genus.

CORALS (Moseley, Zool. pt. 7).

Bathyactis symmetrica (Pourtalès). Many specimens; for distribution see Station 24.

OPHIUROIDEA (Lyman, Zool. pt. 14).

Ophioglypha convexa, n.sp., (young). Obtained also at Stations 246 and 346, 2050 and 2350 fathoms.

Amphiura cernua, n.sp. Obtained at no other locality.

Ophiocreas abyssicola, n.sp. Obtained at no other locality.

HOLOTHURIOIDEA (Théel, Zool. pt. 13).

Elpidia rigida, n.sp. One specimen; obtained at no other locality.

Achlyonice paradoxa, n.g., n.sp. Two specimens; obtained at no other locality.

Oneirophanta mutabilis, n.g., n.sp. Obtained also at Stations 146, 157, 160, 244, 281, 299, and 325. Only species of the genus.

GEPHYREA (Selenka, Zool. pt. 36).

Phascolosoma flagriferum, n.sp. Two specimens; obtained also at Station 44.

ANNELIDA (M'Intosh, Zool. pt. 34).

Lætmonice producta, Grube, var. *benthaliana*, nov. Obtained also at Stations 147, 157, and 244.

Nicomache (?) *benthaliana*, n.sp. One specimen; obtained at no other locality.

Eusamytha pacifica, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

OSTRACODA (Brady, Zool. pt. 3).

Cythere suhmi, n.sp. Obtained also at Station 145.

AMPHIPODA (Stebbing, Zool. pt. 67).

Paradryope orguion, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Lanceola pacifica, n.sp. One specimen; obtained at no other locality.

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Gasteropoda.

Trochus (*Bembix*) *abyssorum*, Smith, n.sp. [See *Proc. Zool. Soc. Lond.*, 1891, p. 438].

Polyplacophora (Haddon, Zool. pt. 43).

Leptochiton benthus, n.sp. Two specimens ; obtained at no other locality.

Polyzoa (Busk, Zool. pt. 30).

Farciminaria pacifica, n.sp. One specimen ; obtained at no other locality.

Tunicata (Herdman, Zool. pts. 17 and 38).

Culeolus murrayi, n.g., n.sp. Two specimens ; obtained at no other locality.
,, *willemoesi*, n.g., n.sp. One specimen ; obtained at no other locality.
Bathyoncus discoideus, n.g., n.sp. One specimen ; obtained at no other locality.

In addition to the foregoing, the following are recorded in the Station-book :— Several specimens of *Stephanoscyphus* attached to pumice-stones, fragments of *Pourtalesia*, worm-tube, microscopical Isopod (*Arcturus* ?), fragment of an Isopod (probably belonging to a long Munopsid), and a small bivalve.

Excluding Protozoa, nearly 100 specimens of invertebrates were obtained at this Station, belonging to about 35 species, of which 27 are new to science, including representatives of 12 new genera ; 19 of the new species and 3 new genera were not obtained elsewhere.

Willemoes-Suhm writes : "Among the specimens obtained were Aphroditaceans with long setæ of brilliant colours, which I think were previously obtained in deep water, and a fine *Clymene* with the head entire but with broken tail. Two large specimens of a Sipunculid, having no papillæ on the pharynx but on the posterior part of the body, which tapers towards the extremity, apparently belong to Keferstein's genus *Phascolosoma*. There were also a small Isopod, probably an *Arcturus*, and a Gammarid, one inch in length, transparent and with red eyes, which came up alive probably from the surface."

Organisms from the Deposit.

The following species of Foraminifera, Radiolaria, and Diatoms were observed in the deposit from this Station. The sounding-tube indicated two layers in this deposit, the lower one being lighter in colour and containing more calcareous shells ; the soft mud from the tow-nets attached to the trawl was carefully sifted, and was found to contain large numbers of arenaceous Foraminifera, *Biloculina*, *Textularia*, and *Truncatulina* (two or three of the *Biloculinæ* contained sarcode, which was of a yellowish colour, the nucleus colouring readily with carmine) :—

FORAMINIFERA (Brady, Zool. pt. 22).—The pelagic species, which make up about 58 per cent. of the carbonate of lime present in the deposit, are marked thus ×. STATION 241.

Biloculina depressa, d'Orbigny.
Miliolina labiosa (d'Orbigny).
Ophthalmidium tumidulum, Brady.
Hyperammina ramosa, Brady.
„ *subnodosa*, Brady.
Reophax dentaliniformis, Brady.
„ *difflugiformis*, Brady.
„ *distans*, Brady.
„ *nodulosa*, Brady.
Haplophragmium agglutinans (d'Orbigny).
„ *globigeriniforme* (Parker and Jones).
„ *latidorsatum* (Bornemann).
Hormosina globulifera, Brady.
„ *ovicula*, Brady.
Ammodiscus gordialis (Jones and Parker).
Trochammina pauciloculata, Brady.
„ *trullissata*, Brady.
Textularia agglutinans (d'Orbigny).
„ *gramen*, d'Orbigny.
Verneuilina pygmæa (Egger).
„ *spinulosa*, Reuss.
Gaudryina baccata, Schwager.
Clavulina communis, d'Orbigny.
Bolivina punctata, d'Orbigny.
Cassidulina subglobosa, Brady.
Ehrenbergina serrata, Reuss.
Chilostomella ovoidea, Reuss.
Lagena acuta (Reuss).
„ *acuticosta*, Reuss.
„ *alveolata*, Brady.
„ *apiculata*, Reuss.
„ *aspera*, Reuss.
„ *auriculata*, Brady.
„ „ var. *costata*, Brady.
„ *exsculpta*, Brady.
Lagena feildeniana, Brady.
„ *fimbriata*, Brady.
„ *gracillima* (Seguenza).
„ *hexagona* (Williamson).
„ *hispida* (Reuss).
„ *lævigata* (Reuss).
„ *lævis* (Montagu).
„ *marginata* (Walker and Boys).
„ *orbignyana* (Seguenza).
„ *ovum* (Ehrenberg).
„ *semistriata*, Williamson.
„ *squamosa* (Montagu).
„ *stelligera*, Brady.
„ *striata* (d'Orbigny).
„ *striatopunctata*, Parker and Jones.
„ *sulcata* (Walker and Jacob).
„ *trigono-marginata*, Parker and Jones.
Nodosaria scalaris (Batsch).
Polymorphina angusta, Egger.
„ *lactea* (Walker and Jacob).
Uvigerina asperula, Czjzek.
× *Globigerina bulloides*, d'Orbigny.
× „ *dubia*, Egger.
× „ *inflata*, d'Orbigny.
× *Orbulina universa*, d'Orbigny.
Pullenia quinqueloba, Reuss.
„ *sphæroides* (d'Orbigny).
Sphæroidina bulloides, d'Orbigny.
Truncatulina pygmæa, Hantken.
„ *ungeriana* (d'Orbigny).
Pulvinulina exigua, Brady.
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
Nonionina depressula (Walker and Jacob).
„ *umbilicatula* (Montagu).

RADIOLARIA (Haeckel, Zool. pt. 40).

Cromyosphæra bigemina, Haeckel.
Trypanosphæra coronata, Haeckel.
Clathrosphæra circumtexta, Haeckel.
Sphærostylus trigla, Haeckel.
Staurosphæra johannis, Haeckel.
Hexalonche aristarchi, Haeckel.
Ellipsostylus ornithoides, Hacckel.
Pipetta conus, Haeckel.
Cyphinidium amphistylium, Haeckel.
Desmocampe atractus, Haeckel.
Desmartus larvalis, Haeckel.
Cenodiscus rotula, Haeckel.
Trochodiscus medusinus, Haeckel.
Heliodiscus pertusus, Haeckel.
Stylodictya stellata, Bailey.
Trizonium staurobelonium, Haeckel.
Zonarium tetratholium, Haeckel.
Soreuma spinosum, Haeckel.

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Zygocircus hexagonus, Haeckel.
Semantidium signatorium, Haeckel.
Tristephanium dimensivum, Haeckel.
Acrocubus lasanum, Haeckel.
Triceraspyris maniculata, Haeckel.
Gorgospyris medusa, Haeckel.
Acrospyris dictyophimus, Haeckel.
Tripilidium dichopodium, Haeckel.
Carpocanistrum acephalum, Haeckel.
Calpophæna ennearrhabda, Haeckel.
Eucecryphalus mülleri, Haeckel.
Sethopyramis bicornis, Haeckel.
Anthocyrtium pyrum, Haeckel.
Clistophæna hexolena, Haeckel.
Podocyrtis sirena, Haeckel.
Cycladophora tetrapleura, Haeckel.
Theocapsa baerii, Haeckel.
Stichopera pectinata, Haeckel.
Phormocampe eucalyptra, Haeckel.
Cyrtophormis aculeata, Haeckel.
Lithostrobus tristichus, Haeckel.
Lithocampe aquilonaris, Haeckel.
Oroplegma spongiosum, Haeckel.
Challengeron bethelli, Murray.
Haeckeliana darwiniana, Haeckel.
Conchopsis compressa, Haeckel.

Diatomaceæ.—The following species were observed by Mr. Comber.

Actinocyclus punctulatus, Castracane.
Actinoptychus areolatus, A. Schmidt.
Asteromphalus brookei, Bailey.
Coscinodiscus lineatus, Ehrenberg.
„ *leptopus*, Janisch.
„ *excentricus*, Ehrenberg.
„ *subtilis*, Ehrenberg.
„ *concinnus*, Smith, var. *jonesiana*, Greville.
„ *marginatus*, Ehrenberg, and var.
„ *fimbriato-limbatus*, Ehrenberg.
„ *radiatus*, Ehrenberg.
„ „ var. *media*, Grunow.
„ *argus*, Ehrenberg.
Coscinodiscus borealis, Bailey.
„ *crassus*, Bailey,
„ *convexus*, A. Schmidt.
„ *nodulifer*, Janisch.
„ *decrescens*, Grunow.
„ *excavatus*, Greville.
„ *oculus-iridis*, Ehrenberg.
„ *asteromphalus*, Ehrenberg.
Ethmodiscus sp. (?).
Stictodiscus varians, Castracane.
Hemidiscus cuneiformis, Wallich.
Chætoceros coarctatus, Lauder.
Bacteriastrum varians, Lauder.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Actissa radiata, Haeckel.
Stylosphæra nana, Haeckel.
Hexacontium periplectum, Haeckel.
Spongiomma clavatum, Haeckel.
Spongothamnus furcatus, Haeckel.
Dicranastrum bifurcatum, Haeckel.
Myelastrum papilio, Haeckel.
Monozonium alatum, Haeckel.
Lithophyllium gladiatum, Haeckel.
Astrocapsa quadrifida, Haeckel.
Icosaspis icosahedra, Haeckel.
Diploconus cylindrus, Haeckel.
Polyplagia viminaria, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Aulacantha spinosa, Haeckel.
Auloceros furcosus, Haeckel.
Sagoscena cruciarium, Haeckel.
Sagmidium crucicorne, Haeckel.
Aulastrum dendroceros, Haeckel.
Castanella balfouri, Haeckel.
Castanidium bethelli, Haeckel.

Ostracoda (Brady, Zool. pt. 3).

Halocypris atlantica, Lubbock.
,, *brevirostris*, Dana.
,, *imbricata*, n.sp.

Copepoda (Brady, Zool. pt. 23).

Calanus propinquus, n.sp.
,, *tonsus*, n.sp.

Amphipoda (Stebbing, Zool. pt. 67). Station 241.

Paraphronima cuivis, n.sp.

Schizopoda (Sars, Zool. pt. 37).

Euphausia pellucida, Dana.

Pteropoda (Pelseneer, Zool. pt. 65).

Cavolinia tridentata (Forskål).

In addition, the following are recorded in the note-books from the surface and down to 60 fathoms:—Diatoms, *Pyrocystis*, *Peridinium* (a few), *Globigerina*, *Orbulina*, *Hastigerina*, Medusæ, Siphonophoræ, *Bipinnaria*, Ophiurid and other Echinoderm larvæ, *Sagitta*, *Alciopa*, *Tomopteris*, *Saphirina* and other Copepods, Hyperids, *Phronima*, *Oxycephalus*, *Vibilia*, *Euphausia* megalopæ, *Lucifer*, *Sergestes*, *Phyllosoma*, Zoëæ, Archizoëa, *Halobates*, *Atlanta*, *Pneumonoderma* and other Pteropods, transparent cuttle-fish, *Doliolum*, *Salpa*, *Appendicularia*. Many circular masses of *Lepas* attached around small bladders of a sea-weed, and a large log covered with *Lepas* and *Balanus*, passed the ship during the day,

Station 242 (Sounding 384), Yokohama to Sandwich Islands (see Chart 36 and Diagram 17). Station 242.

June 24, 1875; lat. 35° 29′ N., long. 161° 52′ E.
Temperature of air at noon, 70°·3; mean for the day, 70°·0.
Temperature of water:—

	°		°
Surface,	68·5	400 fathoms,	39·6
25 fathoms,	62·9	500 ,,	38·2
50 ,,	60·7	600 ,,	37·4
75 ,,	58·3	700 ,,	36·9
100 ,,	56·0	800 ,,	36·5
125 ,,	54·1	900 ,,	36·3
150 ,,	52·2	1000 ,,	36·1
175 ,,	50·3	1100 ,,	35·9
200 ,,	48·3	1200 ,,	35·8
225 ,,	46·4	1300 ,,	35·7
250 ,,	44·4	1400 ,,	35·5
275 ,,	42·8	1500 ,,	35·3
300 ,,	41·6	Bottom,	35·1

Density at 60° F. at surface, 1·02590; bottom, 1·02560.
Depth, 2575 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Station 242. At 3.10 P.M. shortened and furled sails, and got up steam. At 4 P.M. sounded in 2575 fathoms. Obtained serial temperatures down to 1500 fathoms. At 6.30 P.M. completed temperatures and made sail to a good southerly breeze.

Distance at noon from Honolulu, 2311 miles. Made good 173 miles. Amount of current 13 miles, direction N. 25° E.

Organisms from Surface-Nets. **Surface Organisms.**—The following species are recorded from the surface at this Station :—

Pteropoda (Pelseneer, Zool. pt. 58).	Tunicata (Herdman, Zool. pt. 76).
Notobranchæa inopinata, n.sp.	*Doliolum challengeri*, n.sp.

In addition, the following are recorded in the note-books from the surface and down to 60 fathoms:—*Pyrocystis*, *Peridinium tripos*, *Globigerina*, *Orbulina*, *Collosphæra*, one specimen of *Challengeria* and other Radiolaria, *Sagitta*, *Cypridina*, *Saphirina* and other Copepods, Hyperids, Phronimids, *Euphausia*, small *Ethella*-like shells, and Pteropods

Station 243. **Station 243** (Sounding 385), Yokohama to Sandwich Islands (see Chart 36 and Diagram 17).

June 26, 1875 ; lat. 35° 24′ N., long. 166° 35′ E.

Temperature of air at noon, 73°·8 ; mean for the day, 72°·8.

Temperature of water :—

	°		°
Surface,	71·0	300 fathoms,	45·0
10 fathoms,	70·3	400 „	40·5
20 „	65·6	500 „	39·1
30 „	63·9	600 „	38·1
50 „	60·4	700 „	37·2
75 „	59·3	800 „	36·6
100 „	58·3	900 „	36·1
125 „	57·2	1000 „	35·9
150 „	56·2	1100 „	35·8
175 „	55·1	1200 „	35·7
200 „	53·5	1300 „	35·5
225 „	52·0	1400 „	35·4
250 „	49·6	1500 „	35·3
275 „	47·2	Bottom,	35·0

Density at 60° F. :—

Surface,	1·02562	200 fathoms,	1·02552
50 fathoms,	1·02570	300 „	1·02525
100 „	1·02559	400 „	1·02542

Depth, 2800 fathoms ; deposit, Red Clay.

At 2.45 A.M. shortened and furled sails. At 4.30 A.M. put over trawl, veering 3500 fathoms. At 6 A.M. brought ship to wind and sounded in 2800 fathoms. No sample of the deposit was obtained, but on allowing the water from the water-bottle to settle slight indications of Red Clay were obtained. Took serial temperatures down to 1500 fathoms. At 11 A.M. the trawl-rope parted close to one of the blocks on the forecastle. At 2 P.M. put over deep-sea tow-nets, one attached to the end of the line, two 250 fathoms from the end, and two 1200 fathoms from the end; about 3000 fathoms of line were veered, but the lead did not touch the bottom. All the nets, except the bottom one, came up foul of the line, but contained a number of Phæodaria. At 5 P.M. made sail. Albatrosses, boatswain birds, and stormy petrels were seen about the ship. STATION 243.

Distance at noon from Honolulu, 2048 miles. Made good 100 miles. Amount of current 16 miles, direction N. 35° E.

Surface Organisms.—The following species are recorded from the surface and deep-sea tow-nets at this Station :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Siphonosphæra pipetta, Haeckel.
Stylosphæra nana, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Aulacantha spinosa, Haeckel.
Auloceros furcosus, Haeckel.
Sagoscena cruciarium, Haeckel.
Sagmidium crucicorne, Haeckel.
Aulastrum dendroceros, Haeckel.
Castanella balfouri, Haeckel.
Castanidium bethelli, Haeckel.

AMPHIPODA (Stebbing, Zool. pt. 67).

Paraphronima cuivis, n.sp.
Platyscelus ovoides (Risso ?).

PTEROPODA (Pelseneer, Zool. pt. 65).

Limacina bulimoides (d'Orbigny).

In addition, the following are recorded in the note-books :—*Ceratium* (*Peridinium*) *tripos* (a few), *Ethmodiscus*, *Rhizosolenia*, and other Diatoms, *Globigerina*, *Orbulina*, *Pulvinulina micheliniana*, Medusæ, Siphonophoræ, *Sagitta*, *Tomopteris*, Sipunculid larvæ (?), *Cypridina*, *Setella* and other Copepods, Hyperids, Phronimids, *Euphausia*, Zoëæ, small *Ethella*-like shells, *Atlanta*, Pteropods and larvæ, *Doliolum*, *Appendicularia*. *Pyrocystis* appeared to be quite absent from the surface, as well as *Saphirina*, *Lucifer*, and *Hastigerina*.

Station 244 (Sounding 386), Yokohama to Sandwich Islands (see Chart 36 and Diagram 17). STATION 244.

June 28, 1875 ; lat. 35° 22′ N., long. 169° 53′ E.

Temperature of air at noon, 71°·8 ; mean for the day, 71°·4.

Station 244.

Temperature of water :—

Surface,	70·5	400 fathoms,	40·4
25 fathoms,	61·0	500 „	38·9
50 „	59·2	600 „	38·0
75 „	57·6	700 „	37·4
100 „	56·2	800 „	36·9
125 „	54·9	900 „	36·4
150 „	53·3	1000 „	36·0
175 „	51·7	1100 „	35·7
200 „	49·8	1200 „	35·5
225 „	48·0	1300 „	35·3
250 „	46·0	1400 „	35·3
275 „	44·3	1500 „	35·3
300 „	43·1	Bottom,	35·3

Density at 60° F. :—

Surface,	1·02566	300 fathoms,	1·02519
25 fathoms,	1·02563	400 „	1·02521
50 „	1·02559	600 „	1·02521
100 „	1·02552	Bottom,	1·02571
200 „	1·02534		

Depth, 2900 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 3.15 A.M. shortened sail. At 4 A.M. got up steam, and proceeded to lay out trawl, veering 3500 fathoms. At 6 A.M. brought ship to wind, proceeded under steam, and sounded in 2900 fathoms. Obtained serial temperatures down to 1500 fathoms. At noon commenced heaving in trawl, which came up torn at 3.50 P.M., but with numerous animals, a bag full of clay, many pumice-stones and manganese nodules, and a few sharks' teeth (*Lamna*, &c.). This was the most successful haul hitherto made from a depth of 2900 fathoms, and proved the abundance of highly-organised life in great depths. At 4 P.M. made sail. A boatswain bird was seen along with many black albatrosses (*Diomedea brachyura*), and several of the latter were caught with hook and line, in the stomachs of which several specimens of Entozoa (*Tænia diomedeæ*, n.sp., and *Tetrabothrium torulosum*, n.sp.) were found (see Linstow, Zool. pt. 71).

Distance at noon from Honolulu, 1891 miles. Made good 69 miles. Amount of current 15 miles, direction N. 63° E.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Deep-Sea Keratosa (Haeckel, Zool. pt. 82).

Psammophyllum annectens, n.g., n.sp. Obtained at no other locality.

Station 244. Animals from Trawl.

Antipatharia (Brook, Zool. pt. 80).

Bathypathes patula, n.g., n.sp. One specimen; obtained also at Stations 195, 218 (var.), and 246.

Actiniaria (Hertwig, Zool. pts. 15 and 73).

Antheomorphe elegans, n.g., n.sp. Three specimens; obtained at no other locality. Only species of the genus.

Amphianthus ornatum, n.g., n.sp. One specimen; obtained also at Stations 56 and 241. The only other species of the genus (*Amphianthus bathybium*) was taken at Station 241.

Sicyonis elongata, n.g., n.sp. One specimen; obtained at no other locality. The only other species of the genus (*Sicyonis crassa*) was taken at Station 147.

Another Actinian, genus and species undetermined.

Corals (Moseley, Zool. pt. 7).

Bathyactis symmetrica (Pourtalès). Two specimens; for distribution see Station 24.

Hydroida (Allman, Zool. pt. 70).

Stylactis vermicola, n.sp. One colony (attached to the back of *Lætmonice producta*, var. *benthaliana*); obtained at no other locality.

Crinoidea (Carpenter, Zool. pt. 60).

Antedon abyssicola, n.sp. Two specimens; obtained also at Station 160.

Asteroidea (Sladen, Zool. pt. 51).

Hymenaster infernalis, n.sp. One specimen; obtained at no other locality.

Benthaster wyville-thomsoni, n.g., n.sp. Obtained at no other locality. The only other species of the genus (*Benthaster penicillatus*) was taken at Station 218.

Freyella heroina, n.sp. Obtained at no other locality.

Echinoidea (Agassiz, Zool. pt. 9).

Pourtalesia laguncula, n.sp. Obtained also at Stations 168, 169, 191, and 232.

Holothurioidea (Théel, Zool. pts. 13 and 39).

Oneirophanta mutabilis, n.g., n.sp. Obtained also at Stations 146, 157, 160, 241, 281, 299, and 325. Only species of the genus.

Pseudostichopus villosus, n.g., n.sp. One specimen; obtained also at Stations 61, 146, 147, 156, 157, 216, 296, 302, and 325.

Holothuria thomsoni, n.sp. Three specimens; obtained also at Station 237.

Station 244.

Annelida (M'Intosh, Zool. pt. 34).

Lætmonice producta, Grube, var. *benthaliana*, nov. Many specimens; obtained also at Stations 147, 157, and 241.

Several tubes of a form allied to *Eusamytha pacifica*, n.g., n.sp.

Placostegus ornatus, Sowerby. Obtained also at Stations 253 and 285, 3125 and 2375 fathoms.

Cirripedia (Hoek, Zool. pt. 25).

Lepas anatifera, Linné. Shell only; a widely-distributed species at the surface.

Lamellibranchiata (Smith, Zool. pt. 35).

Neæra murrayi, n.sp. Obtained at no other locality.

Semele (*Abra*) *profundorum*, n.sp. Two specimens; obtained also at Stations 73, 85, and 98.

Callocardia (?) *pacifica*, n.sp. Two specimens; obtained at no other locality.

Yoldia hoylei, n.sp. Two specimens; obtained at no other locality.

Arca (*Barbatia* ?) *imitata*, n.sp. Obtained at no other locality.

Brachiopoda (Davidson, Zool. pt. 1).

Terebratula wyvillii, n.sp. Obtained also at Stations 160, 184, 299, 302, and 317.

In addition to the foregoing, the following are recorded in the Station-book:—Very large specimen of *Stephanoscyphus* attached to pumice-stone, fragments of *Scalpellum*, large Peneid shrimp, and small black much-mutilated Stomiatid fish with long hyoid barbel.

Excluding Protozoa, over 70 specimens of invertebrates and fishes were obtained at this Station, belonging to about 32 species, of which 24 are new to science, including representatives of 8 new genera; 11 of the new species and 1 new genus were not obtained elsewhere.

Organisms from the Deposit.

The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

Foraminifera (Brady, Zool. pt. 22).—The pelagic species are marked thus ×.

Biloculina depressa, d'Orbigny.
„ *ringens* (Lamarck).
Miliolina insignis, Brady.
„ *labiosa* (d'Orbigny).
„ *oblonga* (Montagu).
„ *seminulum* (Linné).
Pelosina cylindrica, Brady.
Sorosphæra confusa, Brady (?).
Jaculella acuta, Brady.
Hyperammina ramosa, Brady.
„ *vagans*, Brady.
Aschemonella catenata (Norman).
„ *ramuliformis*, Brady.
Rhizammina algæformis, Brady.

Reophax adunca, Brady.
„ *nodulosa*, Brady.
„ *pilulifera*, Brady.
Haplophragmium agglutinans (d'Orbigny).
„ *globigeriniforme* (Parker and Jones).
„ *latidorsatum* (Bornemann).
„ *rotulatum*, Brady.
„ *scitulum*, Brady.
Hormosina globulifera, Brady.
Hormosina normani, Brady.
Ammodiscus gordialis (Jones and Parker).
Cyclammina cancellata, Brady.
Verneuilina propinqua, Brady.
„ *pygmæa* (Egger).
× *Orbulina universa*, d'Orbigny.
Truncatulina lobatula (Walker and Jacob).
× *Pulvinulina micheliniana* (d'Orbigny).
× „ *patagonica* (d'Orbigny).

STATION 244.

RADIOLARIA (Haeckel, Zool. pt. 40).

Thecosphæra icosactis, Haeckel.
Caminosphæra furcata, Haeckel.
Clathrosphæra circumtexta, Haeckel.
Xiphostylus trochilus, Haeckel.
Amphisphæra mercurius, Haeckel.
Amphistylus hippocampus, Haeckel.
Staurostylus germanicus, Haeckel.
Acanthosphæra fortispina, Haeckel.
Haliomma denticulatum, Haeckel.
Pipettella fusiformis, Haeckel.
Druppatractus testudo, Haeckel.
Spongodruppa frangula, Haeckel.
Cyphinus amphacanthus, Haeckel.
Panartus amphiconus, Haeckel.
Peripanartus atractus, Haeckel.
Sethodiscus macrococcus, Haeckel.
Phacostylus caudatus, Haeckel.
Trigonactura trigonobrachia, Haeckel.
Axodiscus staurophorus, Haeckel.
Ommatodiscus stöhrii, Haeckel.
Xiphodictya amphibelonia, Haeckel.
Staurodictya medusa, Haeckel.
Amphibrachium armatum, Haeckel.
Triolena tribelone, Haeckel.
Triopyle hexagona, Haeckel.
Hexapyle sexangula, Haeckel.
Spongostaurus cruciatus, Haeckel.
Spongasteriscus furcatus, Haeckel.
Larcidium polyacanthum, Haeckel.
Larnacidium staurobelonium, Haeckel.
Octopyle quadrata, Haeckel.
Pylonium circozonium, Haeckel.
Pylozonium octacanthum, Haeckel.
Tholostaurus dodecabelos, Haeckel.
Zoniscus hexathalamus, Haeckel.
Soreuma irregulare, Haeckel.
Sorolarcus terminalis, Haeckel.
Dorataspis micropora, Haeckel.
Archicircus rhombus, Haeckel.
Semantis distoma, Haeckel.
Zygostephanus ramosus, Haeckel.
Acrocubus brachiatus, Haeckel.
Tympaniscus bipes, Haeckel.
Circotympanum decagonium, Haeckel.
Tripospyris semantis, Haeckel.
Tristylospyris scaphipes, Haeckel.
Aegospyris aegoceras, Haeckel.
Petalospyris triomma, Haeckel.
Tiarospyris pervia, Haeckel.
Amphispyris costata, Haeckel.
Acrobotrys tetrasolenia, Haeckel.
Tripodiscium campanula, Haeckel.
Euscenium hemisphæricum, Haeckel.
Archiscenium tripterygium, Haeckel.
Bathropyramis spinosa, Haeckel.
Archiphæna gorgospyris, Haeckel.
Halicapsa lithapium, Haeckel.
Psilomelissa phalacra, Haeckel.
Amphiplecta acrostoma, Haeckel.
Sethophormis triloba, Haeckel.
Sethopyramis quadrata, Haeckel.
Plectopyramis quadratomma, Haeckel.
Acanthocorys pristipodia, Haeckel.
Anthocyrtium anthemis, Haeckel.
Carpocanium verecundum, Haeckel.
Sethocyrtis agamemnonis, Haeckel.
Pterocanium eucolpum, Haeckel.
Podocyrtis hexagonalis, Haeckel.
Lithochytris lanterna, Haeckel.
Alacorys polyacantha, Haeckel.
Lamprocyclas saltatricis, Haeckel.
Theoconus junonis, Haeckel.
Theocyrtis proserpinæ, Haeckel.
Theocampe stenostoma, Haeckel.
Theocapsa gessneri, Haeckel.
Stichopilium costatum, Haeckel.

STATION 244.

Stichophæna nonaria, Haeckel.
Stichocorys baerii, Haeckel.
Eucyrtidium bütschlii, Haeckel.
Cyrtocapsa inflata, Haeckel.
Aulographis hexancistra, Haeckel.
Auloceros dicranaster, Haeckel.
Aulospathis tetrodon, Haeckel.
Oroscena baerii, Haeckel.
Aulosphæra spathophora, Haeckel.
Challengeria aldrichi, Murray.
Challengeron triangulum, Haeckel.
„ *moseleyi*, Haeckel.
Haeckeliana darwiniana, Haeckel.
Tuscarora tubulosa, Murray.
Conchopsis compressa, Haeckel.
„ *aspidium*, Haeckel.

ORGANISMS FROM SURFACE-NETS.

Surface Organisms.—The following species are recorded from the surface and deep tow-nets in the vicinity of this Station :—

RADIOLARIA (Haeckel, Zool. pt. 40).

Collozoum ovatum, Haeckel.
Thalassoxanthium medusinum, Haeckel.
Lampoxanthium pandora, Haeckel.
Sphærozoum trigeminum, Haeckel.
Siphonosphæra pipetta, Haeckel.
Saturnalis rotula, Haeckel.
Stylosphæra nana, Haeckel.
Saturnulus annulus, Haeckel.
Hexastylarium elongatum, Haeckel.
Acanthosphæra castanea, Haeckel.
Lithatractus cirsium, Haeckel.
Spongocore pupula, Haeckel.
Cyphonium coscinoides, Haeckel.
Archidiscus plutoniscus, Haeckel.
Dicranastrum tricuspis, Haeckel.
Cenolarcus dimensivus, Haeckel.
Larcarium hexastylum, Haeckel.
Tholartus sagitta, Haeckel.
Acanthometron conicum, Haeckel.
Zygacantha complanata, Haeckel.
Acanthonia convexa, Haeckel.
Stauracantha pinnulata, Haeckel.
Pristacantha dodecodon, Haeckel.
Acanthostaurus bipinnis, Haeckel.
Lithoptera tetragona, Haeckel.
Diporaspis nephropora, Haeckel.
Acontaspis capillata, Haeckel.
Icosaspis tabulata, Haeckel.
Phatnaspis haliommidium, Haeckel.
Diplocolpus dentatus, Haeckel.
Plectaniscus cortiniscus, Haeckel.
Plectanium trigeminum, Haeckel.
Acrospyris fragilis, Haeckel.
Sethophormis medusa, Haeckel.
Sethoconus trochus, Haeckel.
Pterocorys tricornis, Haeckel.
Theocampe cryptoprora, Haeckel.
Cannorrhaphis spinulosa, Haeckel.
Aulacantha spinosa, Haeckel.
Auloceros furcosus, Haeckel.
Sagoscena cruciarium, Haeckel.
Sagmidium crucicorne, Haeckel.
Aulastrum dendroceros, Haeckel.
Challengeria bromleyi, Haeckel.
Castanella balfouri, Haeckel.
Castanidium bethelli, Haeckel.
Conchidium rhynchonella, Haeckel.

SIPHONOPHORÆ (Haeckel, Zool. pt. 77).

Porpitella pectanthis, n.g., n.sp.

SCHIZOPODA (Sars, Zool. pt. 37).

Euchætomera typica, n.g., n.sp.

NUDIBRANCHIATA (Bergh, Zool. pt. 26).

Fiona marina (Forskål).

The surface fauna and flora were much the same as at the previous Station, the following being recorded in the note-books :—*Globigerina*, Diphyids, *Sagitta*, Terebellids, Cytherids, *Saphirina* and other Copepods, *Hyperia*, *Phronima*, *Euphausia* megalopæ, *Sergestes*, Archizoëæ, *Atlanta*, *Pneumonoderma*, *Hyalæa* [= *Cavolinia*], *Spirialis* [= *Limacina*], large *Tiedemannia* [= *Gleba*] with house. STATION 244.

Station 245 (Sounding 387), Yokohama to Sandwich Islands (see Chart 36 and Diagram 17). STATION 245.

June 30, 1875 ; lat. 36° 23′ N., long. 174° 31′ E.
Temperature of air at noon, 69°·8 ; mean for the day, 69°·9.
Temperature of water :—

	°		°
Surface, ...	69·0	300 fathoms, . . .	42·0
10 fathoms, . . .	62·6	400 „ . . .	40·2
20 „ . . .	60·8	500 „ . . .	38·8
30 „ . . .	59·3	600 „ . . .	37·6
40 „ . . .	58·3	700 „ . . .	36·8
50 „ . . .	57·5	800 „ . . .	36·4
75 „ . . .	56·4	900 „ . . .	36·1
100 „ . . .	55·6	1000 „ . . .	35·9
125 „ . . .	54·4	1100 „ . . .	35·7
150 „ . . .	52·9	1200 „ . . .	35·5
175 „ . . .	51·0	1300 „ . . .	35·3
200 „ . . .	48·8	1400 „ . . .	35·1
225 „ . . .	46·2	1500 „ . . .	34·9
250 „ . . .	44·2	Bottom, . . .	34·9
275 „ . . .	43·0		

Density at 60° F. at surface, 1·02556 ; bottom, 1·02553.
Depth, 2775 fathoms ; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 1 P.M. got up steam. At 1.30 P.M. shortened and furled sails, and at 2 P.M. sounded in 2775 fathoms. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in bottom water, and amounted to 35·3 milligrammes per litre. At 4.30 P.M. lowered a line with half a dozen tow-nets attached : two at the bottom, two at 500 fathoms from the bottom, and two at 1000 fathoms from the bottom, the lead being sent down to 2700 fathoms. At 7.40 P.M. hove up tow-nets, the two nets at the end of the rope coming up fouled. At 7.45 P.M. proceeded under steam. Albatrosses, boatswain birds, and Mother Carey's chickens were seen about the ship.

Station 245. Distance at noon from Honolulu, 1708 miles. Made good 132 miles. Amount of current 15 miles, direction N. 16° W.

Organisms from the Deposit. Radiolaria (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

Clathrosphæra circumtexta, Haeckel.
Theocyrtis proserpinæ, Haeckel.
Aulographis hexancistra, Haeckel.
Auloceros dicranaster, Haeckel.
Aulospathis tetrodon, Haeckel.
Challengeria aldrichi, Murray.
Challengeron triangulum, Haeckel.
Haeckeliana darwiniana, Haeckel.
Tuscarora tubulosa, Murray.
Conchopsis compressa, Haeckel.

Organisms from Surface-Nets. Surface Organisms.—The following species are recorded from the surface and deep nets at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Sphærozoum trigeminum, Haeckel.
Siphonosphæra pipetta, Haeckel.
Stylosphæra nana, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Aulacantha spinosa, Haeckel.
Auloceros furcosus, Haeckel.
Challengeria bromleyi, Haeckel.
Challengeron triodon, Haeckel.
Castanella balfouri, Haeckel.
Castanidium bethelli, Haeckel.
Castanissa hoylei, Haeckel.
Conchidium rhynchonella, Haeckel.

Amphipoda (Stebbing, Zool. pt. 67).

Paraphronima cuivis, n.sp.
Phronima atlantica, Guérin.

Macrura (Spence Bate, Zool. pt. 52).

Hymenodora rostrata, n.sp.

In addition, the following are recorded in the note-books from the surface and down to 50 fathoms:—*Peridinium* (*Ceratium*) *tripos* and other species, Diatoms, *Halosphæra*, *Globigerina*, *Orbulina*, *Pulvinulina micheliniana*, Medusæ, Siphonophoræ, Cytherids, *Saphirina* and other Copepods, Zoëæ of Cirripeds (*Archizoëa*), Hyperids, *Oxycephalus*, and other Amphipods, Zoëæ of *Euphausia*, Pteropods and larvæ, *Salpa*, *Doliolum*, *Appendicularia*, *Fritillaria*. Quantities of Cirripeds in spherical masses, and large specimens of *Rhizostoma*, were seen floating past. The tow-nets sent down to deep water contained all the things taken at the surface, and in addition Phæodaria and many other Radiolaria not found on the surface. Larger specimens of *Pulvinulina* and *Orbulina* were taken in the deep hauls than in the surface ones. A large school of dolphins (*Coryphæna*) and sharks were about the ship in the afternoon and evening.

Station 246 (Sounding 388), Yokohama to Sandwich Islands (see Chart 36 and Diagram 17). STATION 246.

July 2, 1875 ; lat. 36° 10′ N., long. 178° 0′ E.
Temperature of air at noon, 73°·3 ; mean for the day, 73°·4.
Temperature of water :—

	°		°
Surface, ...	73·0	300 fathoms, , . .	46·9
10 fathoms, . . .	67·0	400 „ . . .	41·8
20 „ . . .	63·0	500 „ . . .	39·7
30 „ . . .	60·4	600 „ . . .	38·3
40 „ . . .	59·0	700 „ . . .	37·4
50 „ . . .	58·4	800 „ . . .	37·0
75 „ . . .	57·8	900 „ . . .	36·7
100 „ . . .	57·0	1000 „ . . .	36·4
125 „ . . .	56·2	1100 „ . . .	36·1
150 „ . . .	55·3	1200 „ . . .	35·9
175 „ . . .	54·2	1300 „ . . .	35·6
200 „ . . .	53·0	1400 „ . . .	35·3
225 „ . . .	52·0	1500 „ . . .	35·1
250 „ . . .	50·4	Bottom, . . .	35·1
275 „ . . .	48·9		

Density at 60° F :—

Surface, ...	1·02567	300 fathoms, . . .	1·02544
25 fathoms, . . .	1·02563	400 „ . . .	1·02527
50 „ . . .	1·02568	1000 „ . . .	1·02531
100 „ . . .	1·02563	Bottom, . . .	1·02572
200 „ . . .	1·02544		

Depth, 2050 fathoms ; deposit, Globigerina Ooze, containing 56·07 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5 A.M. put trawl over. At 6 A.M. brought ship to wind and sounded in 2050 fathoms. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 1000 fathoms and from the bottom, and amounted respectively to 50·7 and 47·5 milligrammes per litre. At 1.30 P.M. commenced heaving in trawl, which came up at 3.45 P.M. with numerous specimens and many pumice-stones. At 4 P.M. proceeded under steam.

Honolulu distant at noon, 1554 miles. Made good 88 miles. Amount of current 28 miles, direction N. 14° E.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Station 246.

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Suberites senilis, n.sp. One specimen; obtained at no other locality.

Hexactinellida (Schulze, Zool. pt. 53).

Caulophacus sp. (?). One specimen.

Hyalonema (*Stylocalyx*) *depressum*, n.sp. Ten specimens and fragments; obtained also at Station 271, 2425 fathoms.

Pennatulida (Kölliker, Zool. pt. 2).

Umbellula simplex, n.sp. One specimen; obtained at no other locality.

Antipatharia (Brook, Zool. pt. 80).

Bathypathes patula, n.g., n.sp. One specimen; obtained also at Stations 195, 218 (var.), and 244.

,, *alternata*, n.g., n.sp. One specimen; obtained at no other locality.

,, *lyra*, n.g., n.sp. One specimen; obtained also at Station 181.

Asteroidea (Sladen, Zool. pt. 51).

Dytaster spinosus, n.g., n.sp. Obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha convexa, n.sp. Three specimens; obtained also at Stations 241 and 346.

Holothurioidea (Théel, Zool. pt. 13).

Deima validum, n.g., n.sp. Several specimens; obtained at no other locality. The only other species of the genus (*Deima fastosum*) was taken at Station 216A.

Annelida (M'Intosh, Zool. pt. 34).

Melinna pacifica, n.sp. Several specimens; obtained at no other locality.

Ostracoda (Brady, Zool. pt. 3).

Bairdia abyssicola, n.sp. Obtained at no other locality.

,, *minima*, n.sp. Obtained also at Port Jackson.

Cythere dictyon, n.sp. For distribution see Station 24.

,, *acanthoderma*, n.sp. Obtained also at Stations 64, 73, 146, 191A, 296, and 302.

,, *dasyderma*, n.sp. For distribution see Station 5.

,, *circumdentata*, n.sp. Obtained also at Station 276, 2350 fathoms.

Cytheropteron mucronalatum, n.sp. Obtained also at Stations 70, 224, 296, 300, and 302.

CIRRIPEDIA (Hoek, Zool. pt. 25). STATION 246.

Scalpellum gigas, n.sp. Two specimens; obtained at no other locality.
,, *abyssicola*, n.sp. One specimen; obtained at no other locality.

ISOPODA (Beddard, Zool. pt. 48).

Ischnosoma thomsoni, n.sp. One specimen; obtained at no other locality.
Typhlotanais kerguelensis, n.sp. One specimen; obtained also at Station 149.
,, *brachyurus*, n.sp. Three specimens; obtained at no other locality.
Bathytanais bathybrotes, n.g., n.sp. One specimen; obtained also at Port Jackson. Only species of the genus.
Macrostylis latifrons, n.sp. One specimen; obtained at no other locality.

CUMACEA (Sars, Zool. pt. 55).

Leucon tenuirostris, n.sp. One specimen; obtained at no other locality.

MACRURA (Spence Bate, Zool. pt. 52).

Aristeus armatus, n.sp. One specimen; obtained also at Stations 133, 184, 213, 237, 276, and 323.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Nucula profundorum, n.sp. Obtained at no other locality.
Sarepta abyssicola, n.sp. Obtained also at Station 281, 2385 fathoms.
Arca (*Barbatia*) *pteroessa*, n.sp. Many specimens; obtained also at Stations 16, 24, 71, 73, and 237.

SCAPHOPODA and GASTEROPODA (Watson, Zool. pt. 42).

Dentalium keras, n.sp. Several specimens; obtained also at Station 299, 2160 fathoms.
,, *acutissimum*, n.sp. Obtained also at Station 218.
Basilissa lampra, n.g., n.sp. One specimen; obtained at no other locality.
Pleurotoma (*Surcula*) *rotundata*, n.sp. One specimen; obtained at no other locality.
Cithna margaritifera, n.sp. One specimen; obtained at no other locality.

BRACHIOPODA (Davidson, Zool. pt. 1).

Discina atlantica, King. Many specimens; for distribution see Station 106.

TUNICATA (Herdman, Zool. pt. 38).

Styela pusilla, n.sp. One specimen; obtained at no other locality.

Station 246.

Fishes (Günther, Zool. pt. 57).

Macrurus liocephalus, n.sp. Two specimens; obtained also at Station 237.

,, *armatus*, Hector. Three specimens; obtained also at Stations 146, 147, 157, 158, and 271.

Synaphobranchus bathybius, n.sp. One specimen; obtained also at Stations 146 and 237.

In addition to the foregoing, the following are recorded in the Station-book:—Three Actinians, several specimens of *Stephanoscyphus* on pumice-stones, three Ophiurids (besides *Ophioglypha*), four Asteroidea belonging to three species (only one given above), two Polyzoons, and another Brachiopod (besides *Discina*).

Excluding Protozoa, about 150 specimens of invertebrates and fishes were obtained at this Station, belonging to about 48 species, of which 38 are new to science, including representatives of 6 new genera; 19 of the new species were not obtained elsewhere.

Organisms from the Deposit.

The following species of Pteropoda and Foraminifera were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

Pteropoda (Pelseneer, Zool. pt. 65).

Clio pyramidata, Linné.

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 62 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
,, *irregularis*, d'Orbigny.
,, *ringens* (Lamarck).
Spiroloculina tenuis (Czjzek).
Miliolina circularis (Bornemann).
,, *gracilis* (d'Orbigny).
,, *oblonga* (Montagu).
,, *seminulum* (Linné).
Pelosina cylindrica, Brady.
,, sp. (?).
Dendrophrya (?) sp.
Syringammina (?) sp.
Technitella (?) sp.
Sorosphæra confusa, Brady.
Saccammina socialis, Brady.
,, *sphærica*, Sars.
Hyperammina ramosa, Brady.
,, *vagans*, Brady.
Rhabdammina linearis, Brady.
,, sp. (?).
Aschemonella catenata (Norman).
,, *ramuliformis*, Brady.
,, sp. (?).
Rhizammina algæformis, Brady.
,, sp. (?).
Haliphysema sp. (?).
Reophax adunca, Brady.
,, *dentaliniformis*, Brady.
,, *difflugiformis*, Brady.
,, *distans*, Brady.
,, *guttifera*, Brady.
,, *nodulosa*, Brady.
,, *spiculifera*, Brady (?).
Haplophragmium agglutinans (d'Orbigny).
,, *globigeriniforme* (Parker and Jones).

Haplophragmium latidorsatum (Bornemann).
„ *nanum*, Brady.
„ *rotulatum*, Brady.
„ *turbinatum*, Brady.
Thurammina albicans, Brady.
„ *papillata*, Brady.
Hormosina globulifera, Brady.
„ *normani*, Brady.
„ *ovicula*, Brady.
Cyclammina pusilla, Brady.
Textularia agglutinans, d'Orbigny.
„ *aspera*, Brady.
Verneuilina propinqua, Brady.
„ *pygmæa* (Egger).
Gaudryina baccata, Schwager.
„ *pupoides*, d'Orbigny.
Clavulina communis, d'Orbigny.
Virgulina schreibersiana, Czjzek.
„ *subdepressa*, Brady.
Bolivina punctata, d'Orbigny.
Cassidulina bradyi, Norman.
„ *subglobosa*, Brady.
„ sp. (?).
Ehrenbergina serrata, Reuss.
Lagena apiculata, Reuss.
„ *quadricostulata*, Reuss.
Nodosaria communis, d'Orbigny.
„ (*Glandulina*) *lævigata*, d'Orbigny.
Cristellaria crepidula (Fichtel and Moll).
„ sp. (?).
Polymorphina angusta, Egger.
Uvigerina brunnensis, Karrer (?).
„ sp. (?).

× *Globigerina bulloides*, d'Orbigny. STATION 246.
× „ „ var. *triloba*, Reuss.
× „ *conglobata*, Brady.
× „ *dubia*, Egger.
× „ *inflata*, d'Orbigny.
× *Orbulina universa*, d'Orbigny.
Pullenia quinqueloba, Reuss.
„ *sphæroides* (d'Orbigny).
Sphæroidina bulloides, d'Orbigny.
× „ *dehiscens*, Parker and Jones.
Discorbina vilardeboana (d'Orbigny).
Truncatulina lobatula (Walker and Jacob).
„ *pygmæa*, Hantken.
„ *tenera*, Brady.
„ *variabilis*, d'Orbigny.
„ *wuellerstorfi* (Schwager).
Anomalina ammonoides (Reuss).
„ *grosserugosa* (Gümbel).
„ *polymorpha*, Costa.
× *Pulvinulina canariensis* (d'Orbigny).
× „ *crassa* (d'Orbigny).
„ *exigua*, Brady.
„ *favus*, Brady.
„ *hauerii* (d'Orbigny).
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
× „ *patagonica* (d'Orbigny).
× „ *tumida*, Brady.
Rotalia soldanii, d'Orbigny.
Nonionina pompilioides (Fichtel and Moll).
„ *umbilicatula* (Montagu).
Polystomella crispa (Linné).

Surface Organisms.—The following species are recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

SCHIZOPODA (Sars, Zool. pt. 37).
Euchætomera typica, n.g., n.sp.

FISHES (Günther, Zool. pt. 78).
Prymnothonus sp. (?).

In addition, the following are recorded in the note-books :—*Hastigerina* and Challengeridæ from tow-net attached to the weights ; *Pulvinulina*, Radiolaria, Medusæ, *Diphyes*, *Sagitta*, Cytherids, *Archizoëa*, Hyperids, *Phronima*, *Euphausia*, echinated Gasteropod shell and larval Gasteropods, Pteropods. Mr. Murray went out in a boat for surface collecting, but noticed only a few *Collosphæræ* floating in patches. The water was of a deep-blue tint.

Willemoes-Suhm writes : " For the past few days the Nauplius of a Cirriped has been

Station 246. abundant at the surface. It has a very long tail and spines, and has been described by Dohrn under the name of *Archizoëa* (his *Archizoëa gigas* is a larger form found in the Antarctic and on the coast of Chili). These nauplii are more like those of a Lepadid than of a Balanid, and as *Lepas fascicularis* has been floating on the surface in quantities lately it is probable they belong to that species."

Station 247. **Station 247** (Sounding 389), Yokohama to Sandwich Islands (see Chart 36, and Diagrams 17 and 18).

July 3, 1875 ; lat. 35° 48′ N., long. 179° 57′ W.
Temperature of air at noon, 72°·3 ; mean for the day, 71°·3.
Temperature of water :—

	°		°
Surface, ...	73·0	400 fathoms, . . .	40·7
25 fathoms, . . .	63·8	500 „ . . .	39·1
50 „ . . .	58·4	600 „ . . .	38·2
75 „ . . .	56·0	700 „ . . .	37·7
100 „ . . .	54·8	800 „ . . .	37·2
125 „ . . .	54·1	900 „ . . .	36·9
150 „ . . .	53·5	1000 „ . . .	36·6
175 „ . . .	52·5	1100 „ . . .	36·2
200 „ . . .	50·5	1200 „ . . .	35·9
225 „ . .	48·7	1300 „ . . .	35·6
250 „ . . .	46·9	1400 „ . . .	35·3
275 „ . . .	45·0	1500 „ . . .	35·2
300 „ . . .	43·5	Bottom, . . .	35·2

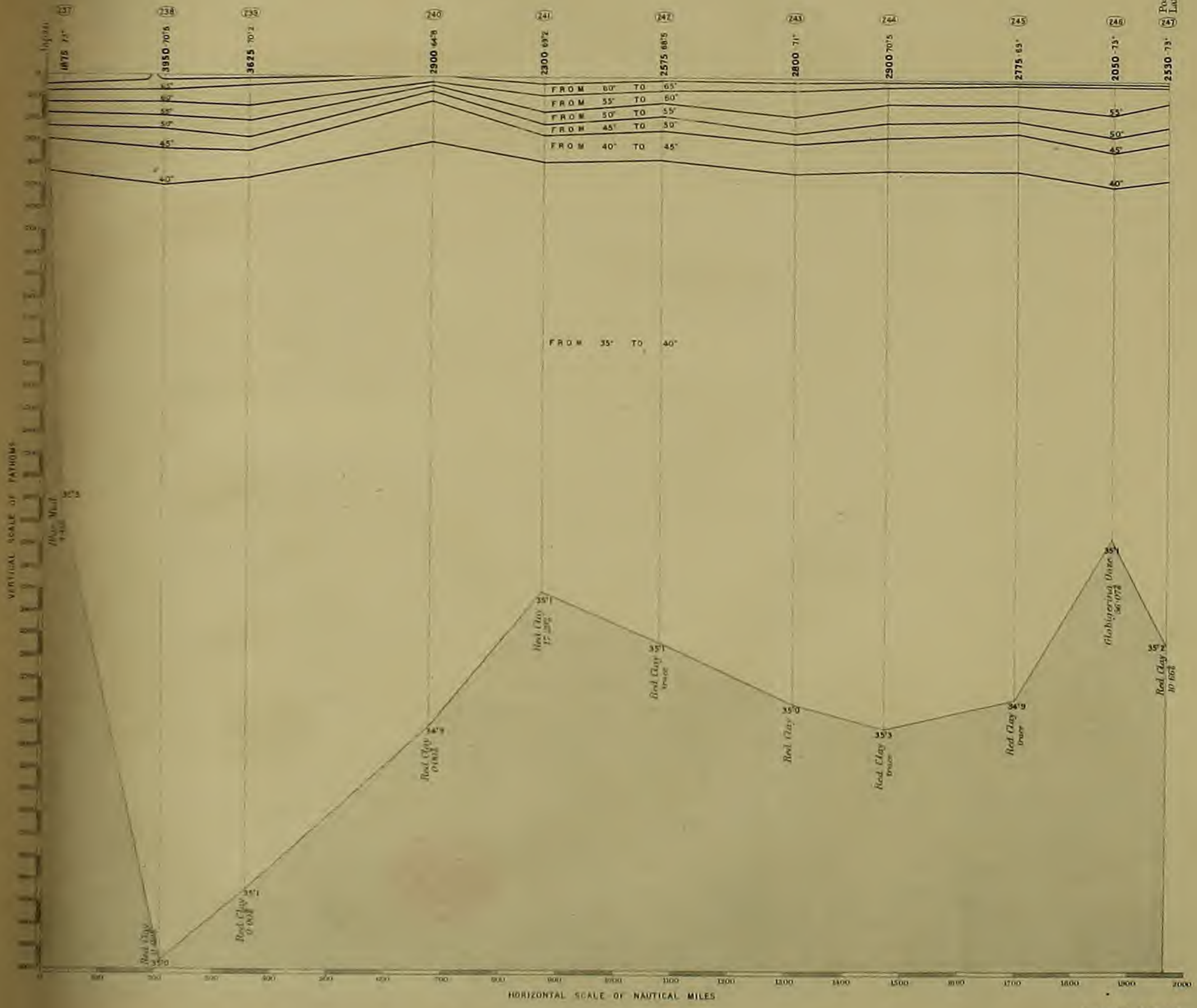
Density at 60° F. at surface, 1·02574 ; bottom, 1·02568.
Depth, 2530 fathoms ; deposit, Red Clay, containing 10·06 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Under steam all forenoon. At 2.20 P.M. stopped and sounded in 2530 fathoms. The upper part of the sounding-tube contained a dark red-coloured clay, about an inch in thickness, which did not effervesce with dilute acid, while the lower part was much lighter in colour, effervesced with acid, contained many *Globigerinæ*, Coccoliths, Echini spines, as well as Diatoms and Radiolaria. The line between the two layers was very sharply marked off by the colour, and judging from our experience in the North Pacific the deeper layer would appear to have been formed in a depth of about 2200 fathoms, so that there are indications here of a probable subsidence of the sea-floor. At 1 P.M. obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in the bottom water, and amounted to 38·2 milligrammes per litre. At 3 P.M. completed

PACIFIC OCEAN

Longitudinal Temperature Section Japan to a position in Lat. 35°49′ N. Long. 180°

For explanation of Symbols see Appendix 1.



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temperatures, and put over line with tow-nets attached, veering 1500 fathoms. At 5 P.M. tow-nets were hauled up, and at 5.10 P.M. made all plain sail. Black albatrosses were about the ship, and several were caught; one of them was painted white, with the view of recognising it again, and set free. Prion-like birds were also seen. STATION 247.

Honolulu distant at noon, 1460 miles. Made good 99 miles. Amount of current 6 miles, direction S. 22° E.

RADIOLARIA (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station :— ORGANISMS FROM THE DEPOSIT.

Clathrosphæra circumtexta, Haeckel.
Podocyrtis argulus, Ehrenberg.
Theocyrtis proserpinæ, Haeckel.
Distephanus pentasterias, Haeckel.
Aulographis hexancistra, Haeckel.
Auloceros dicranaster, Haeckel.
Challengeria aldrichi, Murray.
Challengeron triangulum, Haeckel.
Tuscarora tubulosa, Murray.
Conchopsis compressa, Haeckel.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Sphærozoum trigeminum, Haeckel.
Siphonosphæra pipetta, Haeckel.
Stylosphæra nana, Haeckel.
Plagoniscus euscenium, Haeckel.
Eucoronis arborescens, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Aulacantha spinosa, Haeckel.
Auloceros furcosus, Haeckel.
Challengeria bromleyi, Haeckel.
Castanissa hoylei, Haeckel.
Conchidium rhynchonella, Haeckel.

AMPHIPODA (Stebbing, Zool. pt. 67).

Paraphronima cuivis, n.sp.
Oxycephalus longiceps, Claus.

PTEROPODA (Pelseneer, Zool. pts. 58 and 65).

Dexiobranchæa minuta, n.sp.
Limacina lesueuri (d'Orbigny).
„ *bulimoides* (d'Orbigny).
Clio (*Hyalocylix*) *striata* (Rang).
Cavolinia trispinosa (Lesueur), young (= *Cleodora compressa*, Souleyet).
„ *inflexa* (Lesueur), young (= *Hyalæa depressa*, d'Orbigny).

Tow-nets were sent down to 1200 and 1500 fathoms, and brought up many Phæodaria (the sarcode of which was nearly always dark coloured) and other Radiolaria, as well as many of the ordinary surface organisms taken in the surface-nets. The specimens of *Pulvinulina* taken in the deep nets seemed to be larger and more numerous than in the surface-nets. In these deep hauls there were also a few of the Cyrtoidea, the shells of

Station 247. which are abundant in the deposits, but which are only rarely taken in the surface-nets. In addition to the above, the following are recorded in the note-books :—Diatoms, *Peridinium* (*Ceratium*) *tripos*, *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina*, Medusæ, *Agalmopsis* and other Siphonophoræ, *Sagitta*, tubicolous Annelids, *Cypridina*, *Saphirina* and other Copepods, *Archizoëa*, *Anchylomera*, Phronimids, *Vibilia*, *Bopyrus*, *Euphausia*, *Siriella*, *Ethella*, *Atlanta*, *Cuvierina* and other Pteropods and larvæ, *Salpa*, *Appendicularia*. Small blue *Salpæ*, *Saphirina*, Cirriped Zoëæ, *Cypridina*, and *Orbulina* were especially abundant. *Pyrocystis* was apparently absent from the surface since June 24 (Station 242).

Station 248. **Station 248** (Sounding 390), Yokohama to Sandwich Islands (see Chart 36 and Diagram 18).

July 5, 1875 ; lat. 37° 41′ N., long. 177° 4′ W.
Temperature of air at noon, 73°·3 ; mean for the day, 71°·1.
Temperature of water :—

	°		°
Surface, ...	69·2	300 fathoms, . . .	42·0
10 fathoms, . . .	62·9	400 „ . . .	39·6
20 „ . . .	60·2	500 „ . . .	38·0
30 „ . . .	57·5	600 „ . . .	37·1
40 „ . . .	55·5	700 „ . . .	36·5
50 „ . . .	54·5	800 „ . . .	36·2
75 „ . . .	53·0	900 „ . . .	36·0
100 „ . . .	51·6	1000 „ . . .	35·8
125 „ . . .	50·2	1100 „ . . .	35·6
150 „ . . .	49·0	1200 „ . . .	35·4
175 „ . . .	47·8	1300 „ . . .	35·2
200 „ . . .	46·5	1400 „ . . .	35·1
225 „ . . .	45·2	1500 „ . . .	35·1
250 „ . . .	44·0	Bottom, . . .	35·1
275 „ . . .	43·0		

Density at 60° F. :—

Surface, ...	1·02573	200 fathoms, . . .	1·02525
25 fathoms, . . .	1·02548	300 „ . . .	1·02520
50 „ . . .	1·02547	400 „ . . .	1·02522
100 „ . . .	1·02537	2475 „ . . .	1·02517

Depth, 2900 fathoms ; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.40 A.M. stopped, put trawl over, and veered 3000 fathoms. At 6 A.M. brought

ship to wind, and sounded in 2900 fathoms. At 8 A.M. veered trawl-rope to 3700 fathoms. Obtained serial temperatures down to 1500 fathoms. At 2 P.M. commenced heaving in trawl, which came up at 5 P.M. much torn, but containing many manganese nodules, pumice-stones coated with manganese, sharks' teeth, and a few specimens. At 5.30 P.M. made all plain sail. The carbonic acid was determined in water from 400 and 2475 fathoms, and amounted respectively to 39·2 and 35·3 milligrammes per litre. Black albatrosses were numerous about the ship, and were easily taken with the hook; boatswain birds and prion-like birds were also seen. STATION 248.

Honolulu distant at noon, 1405 miles. Made good 98 miles. Amount of current for the last two days 35 miles, direction N. 75° E.

The following species are recorded in the Zoological Reports from the trawl at this Station :— ANIMALS FROM TRAWL.

MONAXONIDA (Ridley and Dendy, Zool. pt. 59).

Chondrocladia concrescens (Schmidt) (?). Five fragmentary specimens; obtained at no other locality by the Challenger.

HEXACTINELLIDA (Schulze, Zool. pt. 53).

Bathydorus fimbriatus, n.g., n.sp. One specimen; obtained also at Station 241.

HYDROIDA (Allman, Zool. pt. 70).

Monocaulus imperator, n.sp. One specimen; obtained also at Station 237.

TUNICATA (Herdman, Zool. pt. 17).

Hypobythius calycodes, Moseley, n.g., n.sp. One specimen; obtained at no other locality. The only other species of the genus (*Hypobythius moseleyi*) was taken at Station 320.

In addition to the foregoing, the Station-book records :—*Hyalonema* spicules, skeleton of *Farrea* in the interior of a manganese nodule, Holothurian, two fragments of *Diadema* (?), and *Aphrodita*.

Excluding Protozoa, about a dozen specimens of invertebrates were obtained at this Station, belonging to 7 species, of which 3 are new to science, including representatives of 2 new genera; 1 of the new species was not obtained elsewhere.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Lampoxanthium punctatum, Haeckel.
Sphærozoum trigeminum, Haeckel.
Sphærozoum variabile, Haeckel.
Siphonosphæra pipetta, Haeckel.

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Stylosphæra nana, Haeckel.
Myelastrum spinale, Haeckel.
Cenocapsa nirvana, Haeckel.
Hexacolpus dodecodus, Haeckel.
Arachnocorys arachnodiscus, Haeckel.
Sethoconus trochus, Haeckel.
,, *anthocyrtis*, Haeckel.
Theocampe cryptoprora, Haeckel.
Aulacantha spinosa, Haeckel.
Auloceros furcosus, Haeckel.
Challengeria bromleyi, Haeckel.
Castanissa hoylei, Haeckel.
Conchidium rhynchonella, Haeckel.

Cirripedia (Hoek, Zool. pt. 25).

Lepas fascicularis, Ellis and Solander.

On the balls of *Lepas fascicularis* were found Nudibranchs, Aphroditacean Annelids, and *Halobates*. In addition, the following are recorded from the tow-nets:—Diatoms, *Peridinium tripos*, Coccospheres, Rhabdospheres, Infusorians, Medusæ, Ctenophoræ, Cirriped larvæ, *Euphausia*, larval Gasteropods, Pteropods, *Salpa*, *Appendicularia*.

Station 249.

Station 249 (Sounding 391), Yokohama to Sandwich Islands (see Chart 36 and Diagram 18).

July 7, 1875; lat. 37° 59′ N., long. 171° 48′ W.
Temperature of air at noon, 66°·3; mean for the day, 65°·0.
Temperature of water:—

Surface,	65·2	400 fathoms,	40·1
25 fathoms,	57·2	500 ,,	38·5
50 ,,	54·8	600 ,,	37·7
75 ,,	53·3	700 ,,	37·0
100 ,,	52·3	800 ,,	36·5
125 ,,	51·6	900 ,,	36·2
150 ,,	51·1	1000 ,,	35·9
175 ,,	49·8	1100 ,,	35·6
200 ,,	48·0	1200 ,,	35·3
225 ,,	46·4	1300 ,,	35·2
250 ,,	45·0	1400 ,,	35·2
275 ,,	43·7	1500 ,,	35·2
300 ,,	42·7	Bottom,	35·2

Density at 60° F. at surface, 1·02540; bottom, 1·02542.
Depth, 3000 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Strong westerly breeze and heavy sea. At 8 A.M. got up steam. At 9.30 A.M. shortened and furled sails and proceeded under steam to sound. At 11 A.M. sounded in 3000 fathoms. Only a small sample of deposit was obtained, adhering to the sounding-

tube, but the tube had penetrated eighteen, inches into the clay. At 12.30 P.M. obtained serial temperatures down to 1500 fathoms. At 3.40 P.M. completed temperatures and made sail. Albatrosses were still numerous about the ship. STATION 249.

Honolulu distant at noon, 1240 miles. Made good 175 miles. Amount of current 10 miles, direction S. 13° E.

Surface Organisms.—The following species is recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

PTEROPODA (Pelseneer, Zool. pt. 65).

Cavolinia gibbosa (Rang).

In addition, the following are recorded in the note-books :—A few Oscillatoriaceæ, Coccospheres, Rhabdospheres, *Orbulina*, *Pulvinulina*, Radiolaria, *Sagitta*, Copepods, Cirripeds and Zoëæ, *Euphausia*, larval Gasteropods, Heteropods, and Pteropods. Many balls of Cirripeds and large *Rhizostomæ* were in the surface water. On the Cirriped balls were Nudibranchs, Aphroditaceans, *Cymothoa*, and *Halobates*. The stomachs of the Cirriped Zoëæ were filled with Coccospheres, Coccoliths, Rhabdospheres, and Rhabdoliths, and the dung of the Zoëæ was abundant in the water, about 1 mm. in length, tapering towards both ends, of a yellow colour, and composed of a mass of these small Algæ, Diatoms, &c. The stomachs of the *Euphausiæ* contained chiefly the remains of Acanthometræ and Diatoms. A whale and porpoises were seen about the ship.

Station 250 (Sounding 392), Yokohama to Sandwich Islands (see Chart 36 and Diagram 18). STATION 250.

July 9, 1875 ; lat. 37° 49′ N., long. 166° 47′ W.

Temperature of air at noon, 64°·8 ; mean for the day, 63°·6.

Temperature of water :—

	°		°
Surface, ...	65·0	400 fathoms, . . .	42·6
25 fathoms, . . .	58·5	500 „ . . .	40·0
50 „ . . .	55·0	600 „ . . .	38·5
75 „ . . .	54·0	700 „ . . .	37·6
100 „ . . .	53·0	800 „ . . -	36·9
125 „ . . .	52·0	900 „ . . .	36·4
150 „ . . .	51·0	1000 „ . . .	36·2
175 „ . . .	50·1	1100 „ . . .	36·0
200 „ . . .	49·1	1200 „ . . .	35·8
225 „ . . .	48·1	1300 „ . . .	35·6
250 „ . . .	47·1	1400 „ . . .	35·4
275 „ . . .	46·2	1500 „ . . .	35·2
300 „ . . .	45·3	Bottom, . . .	35·0

STATION 250.

Density at 60° F.:—

Surface,	1·02550	300 fathoms,	1·02528
25 fathoms,	1·02537	400 „	1·02531
50 „	1·02449	2800 „	1·02539
100 „	1·02539	Bottom,	1·02568
200 „	1·02542		

Depth, 3050 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.15 A.M. shortened and furled sails, and proceeded under steam to sound. At 6 A.M. sounded in 3050 fathoms. Lowered trawl with two tow-nets attached, but hauled it in again after 800 fathoms had been paid out, as the weather became unfavourable for trawling in great depths. At 7 A.M. took serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 2800 fathoms, and amounted to 37·4 milligrammes per litre. At 11.20 A.M. completed temperatures, and at 11.30 A.M. made sail to a good westerly breeze.

Honolulu distant at noon, 1096 miles. Made good 115 miles. No current for last two days.

Spence Bate (Zool. pt. 52) records in error *Benthesicymus pleocanthus*, n.g., n.sp., and *Gennadas parvus*, n.g., n.sp., from this Station; the specimens probably came from Station 205.

ORGANISMS FROM THE DEPOSIT.

The following species of Radiolaria and Diatoms were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

RADIOLARIA (Haeckel, Zool. pt. 40).

Clathrosphæra circumtexta, Haeckel.
Anthocyrtis spathulata, Haeckel.
Theocyrtis proserpinæ, Haeckel.
Aulographis hexancistra, Haeckel.
Auloceros dicranaster, Haeckel.
Aulospathis triodon, Haeckel.
Challengeron triangulum, Haeckel.
Entocannula circularis, Haeckel.
Tuscarora tubulosa, Murray.
Tuscaridium cygneum, Haeckel.
Conchellium tridacna, Haeckel.
Conchopsis compressa, Haeckel.

DIATOMACEÆ.—The following species were observed by Mr. Rattray.

Coscinodiscus rex, Wallich.
„ *centralis*, Ehrenberg.
„ *excentricus*, Ehrenberg.
„ *marginatus*, Ehrenberg.
„ *curvatulus*, Grunow, var. *genuina*, Grunow.
„ *imperator*, Janisch, an *gazellæ*, Janisch.
„ *anguste-lineatus*, A. Schmidt.
Coscinodiscus lineatus, Ehrenberg.
„ „ forma *major*.
„ *radiatus*, Ehrenberg.
„ „ var. *media*, Grunow.
„ *argus*, Ehrenberg.
„ *polyacanthus*, Grunow.
Asterolampra marylandica, Ehrenberg.
Asteromphalus shadboltianus, Ralfs.

Hemidiscus cuneiformis, Wallich.
Surirella fastuosa, Ehrenberg.
Pleurosigma strigosum, W. Smith.
Synedra ulna, Ehrenberg, var. (fresh-water).
„ (*Ardissonia*) *baculus*, Gregory.
„ *affinis*, Kutzing, var. *hybrida*, Grunow, forma *elongata*.
„ *fulgens*, W. Smith, var. (near *dalmatica*, but with less pronounced terminal swellings).
Gomphonema geminatum, Agardh (fresh water). Station 250.
Nitzschia linearis, W. Smith, var. *tenuis*, Grunow (?) (fresh water).
Navicula (*Pinnularia*) *oblonga*, Kutzing (fresh water).
Thalassiothrix frauenfeldii, Grunow, var. *javanica*, Grunow.
„ *elongata*, Grunow.
„ *longissima*, Grunow.

Surface Organisms.—The following species are recorded from the surface and deep tow-nets attached to the trawl at this Station :— Organisms from Surface-Nets.

Radiolaria (Haeckel, Zool. pt. 40).

Liosphæra peridromium, Haeckel.
Thecosphæra capillacea, Haeckel.
Plegmosphæra pachypila, Haeckel.
Siphonosphæra pipetta, Haeckel.
Stylosphæra nana, Haeckel.
Lychnaspis capillaris, Haeckel.
Dictyophimus cienkowskii, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Aulacantha spinosa, Haeckel.
Auloceros furcosus, Haeckel.
Challengeria bromleyi, Haeckel.
Castanissa hoylei, Haeckel.
Conchidium rhynchonella, Haeckel.

In addition, the following are recorded in the note-books :—*Peridinium* (*Ceratium*) *tripos*, *Globigerina bulloides*, *Orbulina*, *Pulvinulina*, *Sagitta*, *Tomopteris*, *Cypridina*, Copepods, Dohrn's Zoëa, *Oxycephalus*, *Euphausia*, *Atlanta*, *Cardiopoda*, *Oxygyrus*, *Hyalæa* [= *Cavolinia*]. In the tow-nets attached to the trawl, which must have been dragged for some time at a depth of from 300 to 600 fathoms, there were numerous specimens of Challengeridæ, Tuscaroridæ, Concharidæ, and Aulosphæridæ, all with a dark coloured phæodium, but none of these organisms were observed in the tow-nets dragged within 30 fathoms from the surface.

Station 251 (Sounding 393), Yokohama to Sandwich Islands (see Chart 36 and Diagram 18). Station 251.

July 10, 1875 ; lat. 37° 37′ N., long. 163° 26′ W.
Temperature of air at noon, 66°·3 ; mean for the day, 64°·7.

Station 251.

Temperature of water :—

	°		°
Surface,	65·0	400 fathoms,	40·0
25 fathoms,	58·2	500 „	38·5
50 „	55·2	600 „	37·6
75 „	53·5	700 „	37·0
100 „	52·5	800 „	36·8
125 „	51·5	900 „	36·6
150 „	50·5	1000 „	36·3
175 „	49·4	1100 „	36·1
200 „	48·2	1200 „	35·9
225 „	46·9	1300 „	35·6
250 „	45·4	1400 „	35·3
275 „	43·7	1500 „	35·1
300 „	42·8	Bottom,	35·1

Density at 60° F. :—

Surface,	1·02522	2350 fathoms,	1·02544
50 fathoms,	1·02528	Bottom,	1·02572
100 „	1·02536		

Depth, 2950 fathoms; deposit, Red Clay, containing no carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 1.15 P.M. shortened and furled sails. At 1.30 P.M. proceeded under steam, and at 2 P.M. sounded in 2950 fathoms. At 4 P.M. took serial temperatures down to 1500 fathoms. The carbonic acid was determined in three samples of water from the surface, and amounted respectively to 29·1, 27·4, and 27·3 milligrammes per litre. At 5 P.M. completed temperatures, and at 5.15 P.M. made all plain sail. Albatrosses were numerous about the ship, and several were caught, one measuring seven feet three inches from tip to tip of the wings, and weighing 8lbs.; stormy petrels and Mother Carey's chickens were also seen.

Honolulu distant at noon, 1020 miles. Made good 149 miles. Amount of current 5 miles, direction W.

Organisms from the Deposit.

Diatomaceæ.—The following species of Diatoms were observed by Mr. Comber in the deposit from this Station :—

Coscinodiscus sublineatus, Grunow.
„ *leptopus*, Janisch.
„ *excentricus*, Ehrenberg.
„ „ var. *minor*, Rattray.
„ *curvatulus*, Grunow.
„ *symbolophorus*, Grunow.
„ *subtilis*, Ehrenberg.
„ *marginatus*, Ehrenberg.
„ *radiatus*, Ehrenberg.
Coscinodiscus centralis, Ehrenberg.
„ *convexus*, A. Schmidt.
„ *borealis*, Bailey.
„ *concinnus*, Smith.
„ sp. (?).
Ethmodiscus sp. (?).
Hemidiscus cuneiformis, Wallich.
Campylodiscus costatus, W. Smith.

Surface Organisms.—The following species are recorded from the surface at this Station :— Station 251. Organisms from Surface-Nets.

Amphipoda (Stebbing, Zool. pt. 67).

Eupronoë pacifica, n.sp.

Schizopoda (Sars, Zool. pt. 37).

Thysanoëssa gregaria, n.sp.

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Styliola*) *subula* (Quoy and Gaimard).

,, *pyramidata*, Linné.

In addition, the following are recorded in the note-books :—*Globigerina*, *Orbulina*, and other Foraminifera, Acanthometræ and other Radiolaria, Medusæ, *Velella* and other Siphonophoræ, *Alciopa*, tubicolous Annelids, *Distomum*, *Cypridina*, Copepods, Cypris stage of *Lepas fascicularis*, Nauplii, *Archizoëa*, Hyperids, Isopods, *Bopyrus* on *Euphausia*, *Euphausia* megalopæ, *Halobates*, larval Gasteropods and Heteropods, Nudibranchs, *Atlanta*, *Cardiopoda*, *Oxygyrus*, *Pneumonoderma*, *Hyalæa* [= *Cavolinia*], and fish eggs. *Velella* was very abundant in the water ; many of the specimens were dead, and attached to these were *Lepas fascicularis*, *Halobates*, and a Nudibranch. Numbers of small pieces of pumice were also observed, mostly overgrown with a mould, or Alga, giving it a yellow colour ; some of it was exceedingly porous and with an appearance of organic structure.

Station 252 (Sounding 394), Yokohama to Sandwich Islands (see Chart 36 and Diagram 18). Station 252.

July 12, 1875 ; lat. 37° 52′ N., long. 160° 17′ W.
Temperature of air at noon, 67°·5 ; mean for the day, 66°·6.
Temperature of water :—

	°		°
Surface, ...	65·0	400 fathoms, . . .	39·8
25 fathoms, . . .	55·6	500 ,, . . .	38·3
50 ,, . . .	54·0	600 ,, . . .	37·3
75 ,, . . .	52·5	700 ,, . . .	36·7
100 ,, . . .	51·1	800 ,, . . .	36·2
125 ,, . . .	49·9	900 ,, . . .	35·9
150 ,, . . .	48·7	1000 ,, . . .	35·8
175 ,, . . .	47·4	1100 ,, . . .	35·6
200 ,, . . .	46·1	1200 ,, . . .	35·5
225 ,, . . .	45·0	1300 ,, . . .	35·4
250 ,, . . .	44·0	1400 ,, . . .	35·3
275 ,, . . .	43·1	1500 ,, . . .	35·3
300 ,, . . .	42·3	Bottom, . . .	35·3

Station 252.

Density at 60° F. :—

Surface,	1·02535	300 fathoms,	1·02514
35 fathoms,	1·02511	400 „	1·02518
75 „	1·02522	850 „	1·02546
130 „	1·02532	2640 „	1·02527
225 „	1·02527	Bottom,	1·02567

Depth, 2740 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 3 A.M. shortened and furled sails, and got up steam. At 4.30 A.M. proceeded under steam. Put trawl over, veering 3500 fathoms. At 7 A.M. sounded in 2740 fathoms. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in bottom water, and amounted to 42·0 milligrammes per litre. At 1.10 P.M. commenced heaving in trawl, which came up much torn at 4.20 P.M., but containing many hundreds, of manganese nodules (the nuclei of which consisted of pumice, volcanic glass, and *Carcharodon*, *Oxyrhina*, and *Lamna* teeth), and one or two living animals. Swung ship to ascertain error of compasses, and at 6 P.M. proceeded under steam. Albatrosses and stormy petrels were seen.

Honolulu distant at noon, 1002 miles. Made good 57 miles. Amount of current 14 miles, direction N. 43° E.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Isopoda (Beddard, Zool. pt. 48).

Eurycope intermedia, n.sp. One specimen ; obtained at no other locality.

Schizopoda (Sars, Zool. pt. 37).

Boreomysis obtusata, n.sp. One specimen ; obtained also at Station 232.

In addition to the foregoing, a fragment of arm of *Brisinga* and backbone of small fish were attached to the trawl-net, and Professor Thomson remarks that a small starfish, probably a *Hymenaster*, fell off the net as the trawl was being taken in.

Organisms from the Deposit.

Radiolaria (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :—

Siphonosphæra serpula, Haeckel.
Clathrosphæra circumtexta, Haeckel.
Theocyrtis proserpinæ, Haeckel.
Aulographis hexancistra, Haeckel.
Auloceros dicranaster, Haeckel.
Aulospathis triodon, Haeckel.
Challengeron triangulum, Haeckel.
Conchellium tridacna, Haeckel.
Conchopsis compressa, Haeckel.

Surface Organisms.—The following species are recorded from the surface at this Station :— STATION 252. ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Siphonosphæra pipetta, Haeckel.
Stylosphæra nana, Haeckel.
Litholophus penicillus, Haeckel.
Acanthonia quadrifolia, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Aulacantha spinosa, Haeckel.
Auloceros furcosus, Haeckel.
Sagoplegma scenophora, Haeckel.
Aulosphæra undulata, Haeckel.
Auloscena flammabunda, Haeckel.
Challengeria bromleyi, Haeckel.
Gazelletta dendronema, Haeckel.
Polypetta mammillata, Haeckel.
Castanella wyvillei, Haeckel.
Conchidium rhynchonella, Haeckel.
Cœlodendrum bifurcum, Haeckel.
Cœlospathis octodactyla, Haeckel.
Cœlostylus flabellatus, Haeckel.

SCHIZOPODA (Sars, Zool. pt. 37).

Euchætomera typica, n.g., n.sp.

In addition, the following are recorded in the note-books :—*Globigerina*, *Orbulina*, Medusæ, Siphonophoræ, *Distomum*, *Cypridina*, Copepods, Cypris stage of *Lepas fascicularis*, *Archizoëa*, Hyperids, *Phronima*, *Euphausia*, *Sergestes* (?), *Halobates*, Nudibranchs (on dead *Velellæ*), *Atlanta*, *Oxygyrus*, and other Heteropods and larvæ, Pteropods, *Salpa*, fish eggs and egg-capsules (on dead *Velellæ*). Two tow-nets were sent down on the trawl-line—one at the trawl and one at the weights ; the former was completely torn, but the latter contained Phæodaria and other Radiolaria, as well as some Crustacea not observed on the surface. A shark was seen about the ship.

Station 253 (Sounding 395), Yokohama to Sandwich Islands (see Chart 36, and Diagrams 18 and 19). STATION 253.

July 14, 1875 ; lat. 38° 9′ N., long. 156° 25′ W.
Temperature of air at noon, 70°·3 ; mean for the day, 69°·2.
Temperature of water :—

Surface,	67·7	400 fathoms,	39·2
25 fathoms,	58·8	500 „	38·3
50 „	53·4	600 „	37·6
75 „	51·3	700 „	36·9
100 „	50·4	800 „	36·4
125 „	49·6	900 „	36·2
150 „	49·1	1000 „	36·0
175 „	48·2	1100 „	35·8
200 „	46·9	1200 „	35·7
225 „	44·8	1300 „	35·5
250 „	43·0	1400 „	35·3
275 „	41·5	1500 „	35·1
300 „	40·5	Bottom,	35·1

Station 253.

Density at 60° F. :—

Surface,	1·02536	300 fathoms,	1·02517
25 fathoms,	1·02504	400 ,,	1·02537
50 ,,	1·02502	800 ,,	1·02524
100 ,,	1·02534	3000 ,,	1·02578
200 ,,	1·02517	Bottom,	1·02569

Depth, 3125 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.35 A.M. stopped and sounded in 3125 fathoms. At 6 A.M. put over small dredge with swabs and tow-nets at the dredge and weights. At 9 A.M. obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 400, 800, 2990, and 3090 fathoms, and amounted respectively to 39·7, 23·8, 25·5, 30·1 milligrammes per litre. At 1 P.M. commenced heaving in dredge, which came up at 4.40 P.M. with some manganese nodules and a few specimens, and the tow-nets also contained some deposit and manganese nodules. One of the nodules measured 12 × 8 × 2 inches, and had on its upper surface attached Foraminifera, *Serpula*-tubes, four specimens of *Stephanoscyphus*, Polyzoa, Ascidians, while to the under surface some Annelids were attached. At 5 P.M. proceeded under steam. Albatrosses continued to follow the ship.

Distance at noon from Honolulu, 1015 miles. Made good 93 miles. Amount of current 11 miles, direction N.

Animals from Dredge.

The following species are recorded in the Zoological Reports from the dredge at this Station :—

Annelida (M'Intosh, Zool. pt. 34).

Læna abyssorum, n.sp. One specimen; obtained at no other locality.
Placostegus ornatus, Sowerby. One specimen; obtained also at Stations 244 and 285.
,, *benthalianus*, n.sp. One specimen; obtained at no other locality.

Polyzoa (Busk, Zool. pt. 30).

Bugula johnstoniæ, Gray. Fragmentary specimens.
Bifaxaria abyssicola, n.g., n.sp. Obtained at no other locality.
Cribrilina monoceros (Busk). For distribution see Station 145.
Phylactella sp. (?). Fragmentary specimens.

Tunicata (Herdman, Zool. pt. 38).

Bathyoncus minutus, n.g., n.sp. One specimen; obtained at no other locality.

The Station-book records also small Sponge, and four specimens of *Stephanoscyphus* attached to manganese slab. STATION 253.

Excluding Protozoa, about 20 specimens of invertebrates were obtained at this Station, belonging to about 10 species, of which 4 are new to science, including representatives of 2 new genera ; the 4 new species were not obtained elsewhere.

The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :— ORGANISMS FROM THE DEPOSIT.

FORAMINIFERA (Brady, Zool. pt. 22).—The four pelagic species are marked thus ×.

Biloculina depressa (d'Orbigny).
Miliolina labiosa (d'Orbigny).
„ *seminulum* (Linné).
Hyperammina elongata, Brady.
„ *ramosa*, Brady.
Aschemonella ramuliformis, Brady.
Reophax dentaliniformis, Brady.
„ *nodulosa*, Brady.
„ *scorpiurus*, Montfort.
Haplophragmium agglutinans (d'Orbigny).
„ *canariense* (d'Orbigny).
„ *globigeriniforme* (Parker and Jones).
„ *latidorsatum* (Bornemann).
„ *nanum*, Brady.
Thurammina papillata, Brady.
Ammodiscus gordialis (Jones and Parker).
„ *incertus* (d'Orbigny).
Textularia agglutinans, d'Orbigny.
Verneuilina pygmæa (Egger).
Clavulina parisiensis, d'Orbigny.
Bulimina affinis, d'Orbigny (?).
Virgulina schreibersiana, Czjzek.
„ *squamosa*, d'Orbigny.
Chilostomella ovoidea, Reuss.
Lagena lævigata (Reuss).
„ *marginata* (Walker and Boys).
„ *orbignyana* (Seguenza).
„ *semistriata*, Williamson.
× *Globigerina bulloides*, d'Orbigny.
× „ *inflata*, d'Orbigny.
× „ *pachyderma* (Ehrenberg).
× *Orbulina universa*, d'Orbigny.
Truncatulina pygmæa, Hantken.
Pulvinulina umbonata, Reuss.
Nonionina umbilicatula (Montagu).

RADIOLARIA (Haeckel, Zool. pt. 40).

Siphonosphæra serpula, Haeckel.
Mazosphæra hippotis, Haeckel.
Clathrosphæra circumtexta, Haeckel.
Staurosphæra matthæi, Haeckel.
Hexastylus triaxonius, Haeckel.
Hexalonche brevicornis, Haeckel.
Hexacromyum quadrigatum, Haeckel.
Acanthosphæra octahedralis, Haeckel.
Actinomma facetum, Haeckel.
Ellipsostylus ciconia, Haeckel.
Lithatractus hexagonalis, Haeckel.
Cyphinidium apicatum, Haeckel.
Cannartiscus amphiconiscus, Haeckel.
Panartus setosus, Haeckel.
Panarium annularium, Haeckel.
Ommatartus amphiobolus, Haeckel.
Zygocampe corasium, Haeckel.
Crucidiscus endostaurus, Haeckel.
Heliodiscus glyphodon, Haeckel.
Archidiscus stauroniscus, Haeckel.
Tripodictya triacantha, Haeckel.
Euchitonia echinata, Haeckel.
Hexapyle hexacantha, Haeckel.
Larcidium dissacanthum, Haeckel.
Larnacalpis phacodiscus, Haeckel.
Amphipylonium tetraceros, Haeckel.
Pylozonium novemcinctum, Haeckel.
Zoniscus rectangulus, Haeckel.
Pylospira octopyle, Haeckel.
Streblonia globigerina, Haeckel.
Lithocircus furcatus, Haeckel.
Semantrum tetrapylum, Haeckel.

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Microcubus quadrupes, Haeckel.
Dictyospyris biloba, Haeckel.
Botryopera quinqueloba, Haeckel.
Cannobotrys tetracanna, Haeckel.
Peridium lasanum, Haeckel.
Archipera tricornis, Haeckel.
Lychnocanium nodosum, Haeckel.
Sethophormis enneastrum, Haeckel.
Sethophæna polyptera, Haeckel.
Lophophæna echinocephala, Haeckel.
Podocyrtis ehrenbergii, Haeckel.
Phormocyrtis quadrata, Haeckel.
Calocyclas amicæ, Haeckel.
Diplocyclas bicincta, Haeckel.
Theocyrtis proserpinæ, Haeckel.
Theocapsa galeni, Haeckel.
Artopilium cyrtopterum, Haeckel.
Stichophormis cornutella, Haeckel.
Lithostrobus leptoceras, Haeckel.
Stichocorys rathkei, Haeckel.
Eucyrtidium profundissimum, Ehrenberg.
Aulographis hexancistra, Haeckel.
,, *serrulata*, Haeckel.
Aulospathis triodon, Haeckel.
Orosphæra fusigera, Haeckel.
Aularia trigonaria, Haeckel.
Challengeron triangulum, Haeckel.
Tuscarora medusa, Haeckel.
Conchellium tridacna, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Thecosphæra phænaxonia, Haeckel.
Plegmosphæra leptoplegma, Haeckel.
Siphonosphæra pipetta, Haeckel.
Stylosphæra nana, Haeckel.
Hexacontium axotrias, Haeckel.
Acanthosphæra longispina, Haeckel.
Coscinomma ectosiphon, Haeckel.
Ellipsostylus gallinula, Haeckel.
Spongellipsis aspera, Haeckel.
Euchitonia triangulum, Haeckel.
Myelastrum lobatum, Haeckel.
Spongolarcus triaxonius, Haeckel.
Acanthonia quadrifolia, Haeckel.
Xiphacantha macroptera, Haeckel.
,, *platyptera*, Haeckel.
Lonchostaurus rhombicus, Haeckel.
Porocapsa tetrodon, Haeckel.
Echinaspis dichotoma, Haeckel.
Phractopelta tetradopora, Haeckel.
Thoracaspis ellipsoides, Haeckel.
Coleaspis vaginata, Haeckel.
Hexaconus coronatus, Haeckel.
Sethoconus trochus, Haeckel.
Theocorys dianæ, Haeckel.
Theocampe cryptoprora, Haeckel.
Aulacantha spinosa, Haeckel.
,, *lævissima*, Haeckel.
Auloceros furcosus, Haeckel.
Sagoplegma scenophora, Haeckel.
Challengeria bromleyi, Haeckel.
Castanella wyvillei, Haeckel.
Castanura swirei, Haeckel.
Conchidium rhynchonella, Haeckel.
Cælodendrum bifurcum, Haeckel.

Siphonophoræ (Haeckel, Zool. pt. 77).

Porpita fungia, n.sp.

In addition, the following are recorded in the note-books :—*Globigerina*, *Orbulina*, Medusæ, *Diphyes*, *Velella*, *Alciopa*, *Distomum*, *Cypridina*, Copepods, *Lepas fascicularis* with its Nauplius and Cypris stages, Hyperids, *Bopyrus* on *Euphausia*, *Sergestes* and Zoëa, *Ianthina* with float and with *Lepas* attached, larval shells, *Atlanta*, Pteropods,

small fishes and fish eggs. Bunches of white egg-capsules taken on dead *Velellæ* at the previous Station developed in a globe into small shells, similar to those found on the surface—probably larval Heteropods. Many small pieces of pumice, some covered with mould, or Algæ, were again taken in the tow-net, and others formed the nuclei around which the *Lepas* was attached. Very little phosphorescence was noticed on the surface during the past two weeks, and *Pyrocystis* had not lately been noticed in the surface gatherings. STATION 253.

Station 254 (Sounding 396), Yokohama to Sandwich Islands (see Chart 36 and Diagram 19). STATION 254.

July 17, 1875; lat. 35° 13′ N., long. 154° 43′ W.
Temperature of air at noon, 73°·8; mean for the day, 71°·7.
Temperature of water :—

	°		°
Surface,	72·0	400 fathoms,	40·6
25 fathoms,	62·2	500 „	38·8
50 „	57·0	600 „	37·7
75 „	53·9	700 „	37·0
100 „	52·0	800 „	36·5
125 „	50·5	900 „	36·2
150 „	49·3	1000 „	36·0
175 „	48·0	1100 „	35·8
200 „	46·8	1200 „	35·6
225 „	45·9	1300 „	35·4
250 „	45·0	1400 „	35·2
275 „	44·1	1500 „	35·0
300 „	43·3	Bottom,	35·0

Density at 60° F :—

Surface,	1·02570	300 fathoms,	1·02521
25 fathoms,	1·02557	400 „	1·02525
50 „	1·02520	800 „	1·02552
100 „	1·02539	2950 „	1·02548
200 „	1·02532	Bottom,	1·02533

Depth, 3025 fathoms; deposit, Red Clay, containing no carbonate of lime, and relatively much fewer Radiolaria than in the deposits further west (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. stopped and put trawl over. At 6 A.M. sounded in 3025 fathoms. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 400 fathoms and from the bottom, and amounted respectively to 28·7 and

Station 254. 25·4 milligrammes per litre. At 1 P.M. commenced heaving in trawl, but at 3 P.M. the trawl-rope carried away, the trawl with three tow-nets and a few thousand fathoms of rope being lost. A manganese nodule was procured in the water-bottle. At 3.20 P.M. made sail. Albatrosses still followed the ship.

Honolulu distant at noon, 852 miles. Made good 150 miles. Amount of current 3¼ miles, direction S. 28° W.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Cenosphæra cristata, Haeckel.
Octodendron spirale, Haeckel.
Heliodrymus setosus, Haeckel.
Acanthonia quadrifolia, Haeckel.
Xiphacantha macroptera, Haeckel.
Tessaraspis hexagonalis, Haeckel.
Phatnaspis cristata, Haeckel.
Plagiacantha furcata, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Castanella wyvillei, Haeckel.
Calodendrum bifurcum, Haeckel.

Siphonophoræ (Haeckel, Zool. pt. 77).

Porpita fungia, n.sp.

Pteropoda (Pelseneer, Zool. pts. 58 and 65).

Pneumonoderma pacificum, Dall.
,, *souleyeti*, n.sp.
Clionopsis modesta, n.sp.
Clio (*Hyalocylix*) *striata* (Rang).
,, (*Styliola*) *subula* (Quoy and Gaimard).
,, *pyramidata*, Linné.
,, *cuspidata* (Bosc).
Cuvierina columnella (Rang).
Cavolinia tridentata (Forskål).
Cymbulia sp. (?).

In addition, the following are recorded in the note-books :—*Pyrocystis* (two forms), *Peridinium* (*in catena*), *Ethmodiscus*, *Rhizosolenia*, and Diatoms attached to Copepods, Coccospheres and Rhabdospheres abundant on the surface, *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina menardii* and *Pulvinulina micheliniana*, *Tintinnus* and other Infusoria, Medusæ, *Velella*, *Sagitta*, *Alciopa*, *Tomopteris*, *Distomum*, *Cypridina*, *Copilia* and other Copepods, Zoëæ of *Lepas fascicularis*, Hyperids, *Euphausia* with Zoëæ and larvæ, *Atlanta*, *Oxygyrus*, *Tiedemannia* [= *Gleba*], *Appendicularia*, *Fritillaria*, *Doliolum*. A haul from over 100 fathoms brought up a few Challengeridæ and other Radiolaria. There were again a good many small pieces of pumice covered with mould or Algæ, and some seeds which did not seem to have come from the ship. Several specimens of *Pyrocystis noctiluca* were observed to be in process of division, two distinct individuals being surrounded by a common chitinous membrane. Some of the specimens of *Orbulina* had very thin shells, and the *Globigerinæ* inside, attached to the inner surfaces of the *Orbulinæ* by long spines could be seen with great distinctness.

The organisms in the tow-nets to-day showed that the ship had entered another region, where the organisms had a more tropical character, as shown by the re-appearance of *Pyrocystis*, *Ethmodiscus*, several species of Copepods, and other organisms. The surface temperature, it will be observed, was several degrees higher than at the last three or four Stations. STATION 254.

Station 255 (Sounding 397), Yokohama to Sandwich Islands (see Chart 36 and Diagram 19). STATION 255.

July 19, 1875; lat. 32° 28′ N., long. 154° 33′ W.
Temperature of air at noon, 75°·8; mean for the day, 73°·2.
Temperature of water :—

	°		°
Surface,	74·0	400 fathoms,	39·2
25 fathoms,	62·5	500 „	38·1
50 „	60·3	600 „	37·4
75 „	57·6	700 „	36·8
100 „	55·4	800 „	36·4
125 „	53·3	900 „	36·1
150 „	51·4	1000 „	35·8
175 „	49·8	1100 „	35·6
200 „	47·9	1200 „	35·4
225 „	46·6	1300 „	35·2
250 „	45·0	1400 „	35·0
275 „	43·5	1500 „	35·0
300 „	42·4	Bottom,	35·0

Density at 60° F. at surface, 1·02602; 2100 fathoms, 1·02552; bottom, 1·02569.
Depth, 2850 fathoms; deposit, Red Clay, containing no carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 1.15 P.M. stopped to sound. At 2 P.M. sounded in 2850 fathoms. At 3 P.M. obtained serial temperatures down to 1500 fathoms. Lowered second whaler for surface collecting, some interesting specimens being procured. At 4.30 P.M. completed temperatures and proceeded under steam. Albatrosses still numerous about the ship.

Honolulu distant at noon, 702 miles. Made good 132 miles. Amount of current 19 miles, direction S. 5° E.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station :— ORGANISMS FROM SURFACE-NETS.

SIPHONOPHORÆ (Haeckel, Zool. pt. 77).

Porpita fungia, n.sp.

MACRURA (Spence Bate, Zool. pt. 52).

Sergestes ancylops, Krøyer.

Station 255. Mr. Murray was away in a boat, and as it was quite calm he observed a number of things on the surface. There were large masses of Diatoms united into balls or elongated masses, the latter sometimes over six inches in length and two inches in diameter; they were made up of two kinds of Diatoms, or two different stages of development. *Hastigerina* was the most abundant thing on the surface, the specimens looking like little red dots all over the surface, and in the tow-net presenting a red mass. One specimen was taken in a small bottle, and on being placed under the microscope presented a wonderful appearance. The spines were exceedingly long, tapering to a point, and very flexible at the extremities. Between the spines were many small spheres, the pseudopodia running along the spines and occasionally leaving them. The spheres retired on treatment with colouring solution or acid. The specimen with fully-extended spheres floated, while those from the tow-net lay in a mass at the bottom of the globe; all attempts to mount specimens with the spheres extended failed. There were many compound Radiolaria, *Velellæ* with *Ianthinæ* attached, many specimens of *Halobates*, and in addition all the things mentioned at the previous Station, except that *Lepas* was not noticed, nor any of its larval stages, which again indicated that the ship had passed into a region of the ocean where the fauna was different. Several small pieces of pumice were picked up, some of them covered with a brown-coloured Alga, or mould.

Station 256. **Station 256** (Sounding 398), Yokohama to Sandwich Islands (see Chart 36 and Diagram 19).

July 21, 1875; lat. 30° 22′ N., long. 154° 56′ W.
Temperature of air at noon, 76°·8; mean for the day, 74°·5.
Temperature of water:—

	°		°
Surface,	74·0	400 fathoms,	39·7
25 fathoms,	70·0	500 „	38·2
50 „	65·0	600 „	37·3
75 „	60·0	700 „	36·7
100 „	55·6	800 „	36·3
125 „	53·2	900 „	36·1
150 „	51·2	1000 „	35·9
175 „	49·5	1100 „	35·8
200 „	48·0	1200 „	35·7
225 „	46·5	1300 „	35·5
250 „	45·2	1400 „	35·4
275 „	43·8	1500 „	35·3
300 „	42·8	Bottom,	35·2

Station 256.

Density at 60° F. :—

Surface,	1·02636	300 fathoms,	1·02525
25 fathoms,	1·02614	400 „	1·02520
50 „	1·02588	800 „	1·02533
100 „	1·02547	2875 „	1·02537
200 „	1·02530	Bottom,	1·02565

Depth, 2950 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 3.30 A.M. shortened and furled sails. At 4 A.M. got up steam. At 4.40 A.M. proceeded under steam, and at 5 A.M. sounded in 2950 fathoms. At 8 A.M. put small dredge over with tow-nets attached at the weights and at the dredge. At 9 A.M. lowered whaler with naturalist for surface collecting. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 2875 fathoms, and amounted to 29·9 milligrammes per litre. At 1 P.M. commenced heaving in dredge, which came up at 5.30 P.M. with a large quantity of clay, a few manganese nodules, sharks' teeth, and pumice-stones. The tow-net at the dredge contained some mud, while the tow-net at the weights had not touched the bottom and contained some intermediate water organisms. Proceeded under steam. Albatrosses were still numerous; one was shot having a piece of cotton handkerchief round its neck, and one was caught and let go again with a parchment label tied round its neck. Stormy petrels and boatswain birds were also seen.

Honolulu distant at noon, 568 miles. Made good 41 miles. Amount of current 11 miles, direction N. 62° W.

Animals from Dredge.

The following species are recorded in the Zoological Reports from the dredge at this Station :—

Deep-Sea Keratosa (Haeckel, Zool. pt. 82).

Ammoconia sagenella, n.g., n.sp. Obtained at no other locality.

Lamellibranchiata (Smith, Zool. pt. 35).

Leda prolata, n.sp. One specimen; obtained at no other locality.

In the washings of the mud were a few worm-tubes and some arenaceous Foraminifera, while a few specimens of *Stephanoscyphus* were attached to the nodules. Among the nodules was one formed round the vertebra of a small Cetacean.

The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :—

Station 256. Organisms from the Deposit.

Foraminifera (Brady, Zool. pt. 22).—The three pelagic species are marked thus ×.

Hyperammina ramosa, Brady.
Reophax aduncа, Brady.
„ *difflugiformis*, Brady.
„ *nodulosa*, Brady.
„ *scorpiurus*, Montfort.
Haplophragmium latidorsatum (Bornemann).
Ammodiscus gordialis (Jones and Parker).
Trochammina trullissata, Brady.
Cassidulina subglobosa, Brady.
× *Globigerina bulloides*, d'Orbigny.
× „ *inflata*, d'Orbigny.
Pullenia sphæroides, (d'Orbigny).
Truncatulina pygmæa, Hantken.
× *Pulvinulina micheliniana* (d'Orbigny).
Rotalia beccarii (Linné).

Radiolaria (Haeckel, Zool. pt. 40).

Siphonosphæra serpula, Haeckel.
Solenosphæra megalactis, Haeckel.
Hexastylus dimensivus, Haeckel.
Desmartus tubulatus, Haeckel.
Larnacantha dissacantha, Haeckel.
Dendrocircus quadrangulus, Haeckel.
Clathrocircus decaporus, Haeckel.
Tricolocampe stenozona, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Heliosphæra hyperionis, Haeckel.
Cladococcus abietinus, Haeckel.
Leptosphæra polygonalis, Haeckel.
Centrocubus cladostylus, Haeckel.
Amphitholus dodecanthus, Haeckel.
Xiphacantha macroptera, Haeckel.
Icosaspis cruciata, Haeckel.
Phractopelta dyadopora, Haeckel.
Triplagia triradialis, Haeckel.
Sethopera pyrum, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.
Sagosphæra verticilla, Haeckel.
Sagoscena coronata, Haeckel.
Sagmidium unicorne, Haeckel.
Castanella wyvillei, Haeckel.
Calodendrum bifurcum, Haeckel.

Copepoda (Brady, Zool. pt. 23).

Pleuromma abdominale (Lubbock).
Undina vulgaris, Dana.
„ *darwinii*, Lubbock.
Euchæta prestandreæ, Philippi.
Candace truncata, Dana.
Centropages violaceus (Claus).
Pontellopsis villosa, n.g., n.sp.
Pontella detruncata (Dana).
„ *acutifrons* (Dana).
Setella gracilis, Dana.
Corycæus varius, Dana.
Oncæa obtusa (Dana).

Amphipoda (Stebbing, Zool. pt. 67).

Cyphocaris challengeri, n.sp.

Macrura (Spence Bate, Zool. pt. 52).

Sergestes armatus, Krøyer.

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *acicula* (Rang).
„ (*Styliola*) *subula* (Quoy and Gaimard).
„ *pyramidata*, Linné.
Cavolinia inflexa (Lesueur).

Tunicata (Herdman, Zool. pt. 76).

Salpa runcinata - fusiformis, Chamisso—Cuvier.

In addition, the following are recorded in the note-books :—Oscillatoriaceæ, *Peridinium*, *Pyrocystis*, *Ethmodiscus* and other Diatoms, *Halosphæra*, *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina*, Medusæ, *Porpita*, *Physalia*, *Velella*, Ctenophoræ, *Sagitta*, *Tomopteris*, Sipunculid larvæ, *Cypridina*, *Copilia*, *Saphirina*, *Euphausia*, *Siriella*, *Lucifer*, *Amphion*, *Halobates*, *Ianthina*, small shells, *Glaucus atlanticus*, *Doliolum*, *Appendicularia*, flying fishes and other small fishes. The tow-net at the weights brought up many Phæodaria and Nassellaria not met with on the surface. Mr. Murray was away in a boat, but there was a slight breeze and organisms were not so plentiful as at the previous Station, but specimens of *Porpita*, *Physalia*, *Velella*, *Ianthina*, and *Halobates* were collected, and a few specimens of *Hastigerina* and Oscillatoriaceæ were observed with the water-glass. A large shark was seen while dredging. STATION 256.

Station 257 (Sounding 399), Yokohama to Sandwich Islands (see Chart 36 and Diagram 19). STATION 257.

July 23, 1875 ; lat. 27° 33′ N., long. 154° 55′ W.
Temperature of air at noon, 76°·8 ; mean for the day, 73°·4.
Temperature of water :—

Surface,	76·5	400 fathoms,	41·3
25 fathoms,	71·3	500 „	39·5
50 „	65·0	600 „	38·3
75 „	60·0	700 „	37·3
100 „	56·5	800 „	36·7
125 „	53·8	900 „	36·3
150 „	51·8	1000 „	36·0
175 „	50·2	1100 „	35·8
200 „	48·8	1200 „	35·6
225 „	47·4	1300 „	35·4
250 „	46·2	1400 „	35·2
275 „	45·2	1500 „	35·0
300 „	44·2	Bottom,	34·9

Density at 60° F. :—

Surface,	1·02611	200 fathoms,	1·02532
25 fathoms,	1·02607	2850 „	1·02539
50 „	1·02598	Bottom,	1·02581
100 „	1·02557		

Depth, 2875 fathoms ; deposit, Red Clay.

Station 257. At 11 A.M. got up steam. At 11.30 A.M. shortened and furled sails. At noon proceeded under steam. At 1 P.M. sounded in 2875 fathoms. The valves of the sounding-tube had become jammed, and consequently did not open on reaching the bottom, but the tube had sunk two feet into the deposit and was streaked with clay, and sufficient was scraped off to indicate the nature of the deposit. Obtained serial temperatures down to 1500 fathoms. At 4 P.M. completed temperatures, and at 4.15 P.M. made all plain sail. Albatrosses became less numerous; one was caught. Several boatswain birds were seen flying high.

East point of Oahu Island, Sandwich Islands, distant at noon, 402 miles. Made good 89 miles. Amount of current 15 miles, direction S. 45° W.

Organisms from Surface-Nets. **Surface Organisms.**—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).
Coscinaspis stigmopora, Haeckel.
Icosaspis cruciata, Haeckel.
Sethoconus trochus, Haeckel.
Theocampe cryptoprora, Haeckel.

Copepoda (Brady, Zool. pt. 23).
Hemicalanus aculeatus, n.sp.

Macrura (Spence Bate, Zool. pt. 52).
Sergestes oculatus, Krøyer.

Fishes (Günther, Zool. pt. 78).
Thyrsites prometheus, C.V.

Most of the organisms noted at the previous Station were taken at the surface; *Hastigerina* was not, however, noticed. A haul of the tow-net from 500 fathoms brought up *Globigerina*, *Orbulina*, *Pulvinulina*, Phæodaria and other Radiolaria not usually observed at the surface, many specimens of *Cypridina*, *Euphausia*, and *Sergestes*, as well as masses of Diatoms apparently different from those previously seen on the high seas, *Pyrocystis*, *Peridinium*, and small Infusoria. Many of the specimens of *Pyrocystis* were in a state of division, an outer sphere frequently containing two perfectly-separated individuals.

Station 258. **Station 258** (Sounding 400), Yokohama to Sandwich Islands (see Chart 36 and Diagram 19).

July 24, 1875 ; lat. 26° 11′ N., long. 155° 12′ W.
Temperature of air at noon, 77°·5 ; mean for the day, 75°·3.

Temperature of water :— STATION 258.

	°		°
Surface,	77·0	400 fathoms,	40·4
25 fathoms,	72·6	500 „	39·0
50 „	66·6	600 „	38·3
75 „	62·5	700 „	37·6
100 „	58·8	800 „	37·0
125 „	55·3	900 „	36·5
150 „	52·5	1000 „	36·1
175 „	49·8	1100 „	35·8
200 „	47·6	1200 „	35·6
225 „	45·9	1300 „	35·4
250 „	44·5	1400 „	35·2
275 „	43·4	1500 „	35·2
300 „	42·6	Bottom,	35·2

Density at 60° F. at surface, 1·02591 ; bottom, 1·02525.

Depth, 2775 fathoms ; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 1.30 P.M. got up steam to sound. At 2.35 P.M. shortened and furled sails, proceeded under steam, and sounded in 2775 fathoms. Took serial temperatures down to 1500 fathoms. At 6.15 P.M. completed temperatures and made sail. One albatross was seen which proved to be the last in this section of the cruise ; these birds had been observed in numbers ever since the departure from Japan. Several boatswain birds were seen, and a turnstone (*Strepsilas interpres*) flew about the ship in an exhausted condition.

East point of Oahu Island distant at noon, 328 miles. Made good 74 miles. Amount of current 8 miles, direction S. 61° W.

Moseley writes, with reference to the birds observed in this part of the Pacific :— "From the time of leaving Japan up till July 21 we were accompanied by numerous albatrosses, all apparently young birds of last year and all dark, with the exception of the commencement of white about the head and neck. A few stray white-plumaged birds were seen, but rarely. With these was a prion which, however, left us almost directly we turned south. The albatrosses fed tamely round the ship, as many as twenty-four being seen at a time. After July 21 they suddenly diminished in numbers, and on the 22nd and 23rd only two or three stragglers were seen ; on the 24th they were gone. Boatswain birds (*Phæthon*) were seen very far north and far from land before we turned south ; they re-appeared when the albatrosses began to leave. A *Thalassidroma* and large petrel or puffin also were seen."

Surface Organisms.—The following are recorded in the note-books from the surface at this Station :—*Pyrocystis* (two forms), *Globigerina*, *Orbulina*, *Pulvinulina*, Radiolaria, ORGANISMS FROM SURFACE-NETS.

Station 258. larvæ of *Chirodota*, *Sagitta*, Aphroditaecan and other Annelid larvæ, *Cypridina*, *Setella*, *Euphausia*, *Sergestes*, small Lamellibranchs and other Molluscs, *Atlanta*, Pteropods, *Appendicularia*, and *Doliolum*. One specimen of *Pulvinulina menardii* was observed with a large floating apparatus extended and with much yellow sarcodic matter outside the shell. A good many larvæ of *Chirodota*, Aphroditacean and other Annelid larvæ, and small Lamellibranchs and other larval shells were observed, all of which had not been noticed at the surface for some weeks.

Station 259. **Station 259** (Sounding 401), Yokohama to Sandwich Islands (see Chart 36 and Diagram 19).

July 26, 1875; lat. 23° 3′ N., long. 156° 6′ W.
Temperature of air at noon, 80°·0; mean for the day, 76°·4.
Temperature of water:—

Surface,	77°·0	400 fathoms,	40°·5
25 fathoms,	75·6	500 „	39·3
50 „	72·7	600 „	38·6
75 „	69·5	700 „	37·9
100 „	64·5	800 „	37·4
125 „	59·2	900 „	36·9
150 „	55·0	1000 „	36·5
175 „	51·5	1100 „	36·2
200 „	48·8	1200 „	35·9
225 „	46·5	1300 „	35·6
250 „	45·0	1400 „	35·3
275 „	43·8	1500 „	35·0
300 „	42·9	Bottom,	34·9

Density at 60° F.:—

Surface,	1·02574	300 fathoms,	1·02529
25 fathoms,	1·02550	400 „	1·02529
50 „	1·02571	800 „	1·02523
100 „	1·02572	2150 „	1·02550
200 „	1·02527	Bottom,	1·02577

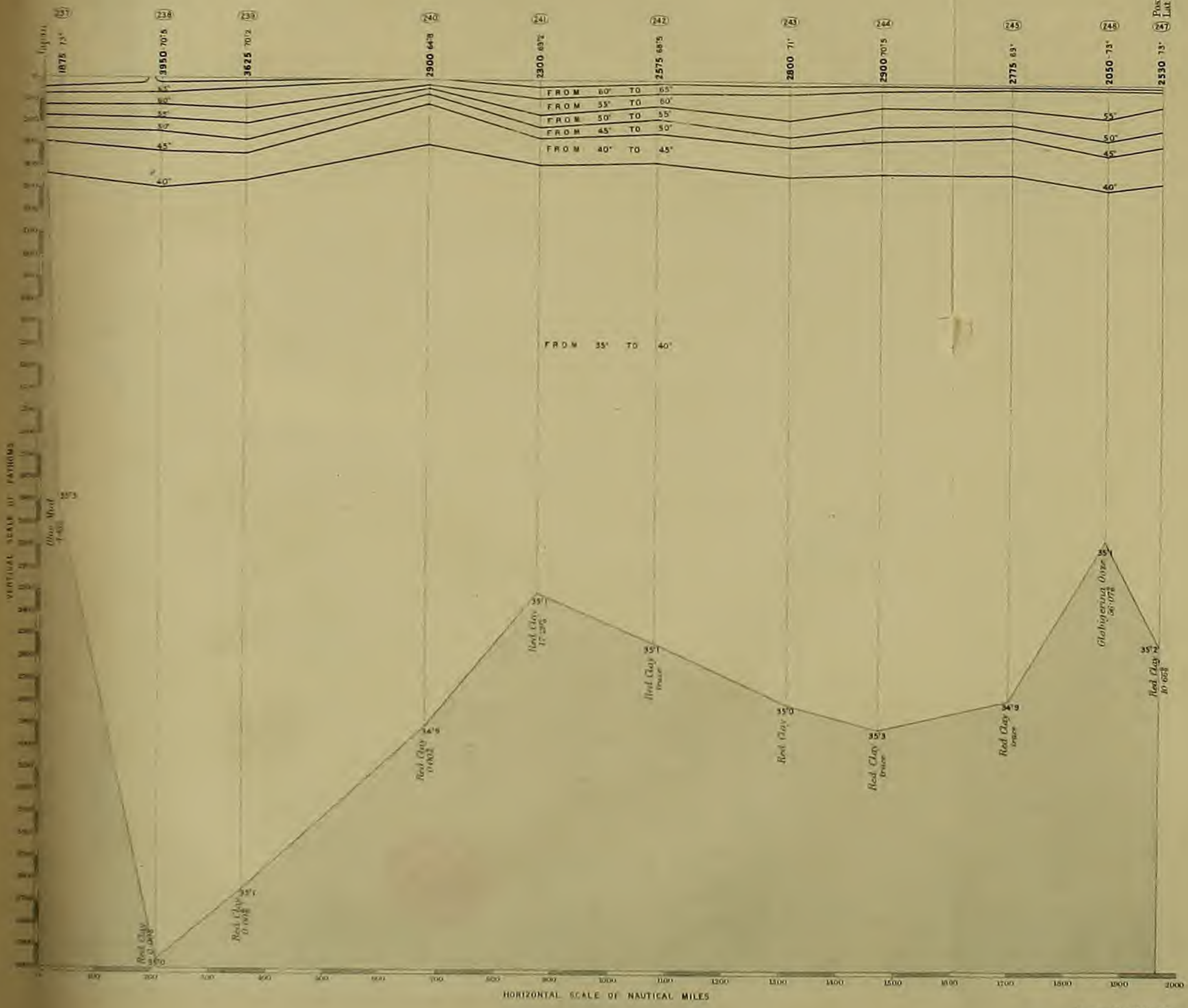
Depth, 2225 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. furled sails and proceeded under steam to sound. At 5 A.M. sounded in 2225 fathoms. Obtained serial temperatures down to 1500 fathoms. At 1 P.M. completed temperatures and proceeded. Boatswain birds, turnstones, other small birds like turnstones, and a large petrel-like bird were seen about the ship.

PACIFIC OCEAN

Longitudinal Temperature Section Japan to a position in Lat. 35°49′ N. Long 180°

For explanation of Symbols see Appendix I.



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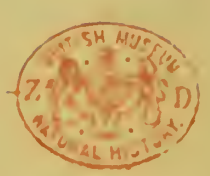


Distance at noon from east point of Oahu Island, 133 miles. Made good 98 miles. Amount of current 10 miles, direction S. 73° W. STATION 259.

Surface Organisms.—The following species is recorded from tow-net sent down to 1000 fathoms at this Station :— ORGANISMS FROM SURFACE-NETS.

FISHES (Günther, Zool. pt. 78).

Branchiostoma pelagicum, n.sp.

The tow-nets at the surface procured the usual organisms, including many *Globigerinæ* with long spines. Four nets were sent down to 1000 fathoms, and brought up : Diatoms, *Pyrocystis* (two forms), *Peridinium*, Oscillatoriaceæ, *Hastigerina*, *Pulvinulina*, larvæ of *Chirodota* and *Balanoglossus*, Annelids, *Cypridina*, *Saphirina* and other Copepods, Phronimids, *Euphausia*, *Sergestes*, *Salpa*, *Appendicularia*, *Amphioxus* and several small fishes. Many of the specimens of *Pyrocystis* were again noticed to be in a state of division ; the outer surfaces of the spheres were covered with little pellucid dots which coloured deeply with carmine.

Station 260 (Sounding 402), Yokohama to Sandwich Islands (see Chart 37). STATION 260.

July 27, 1875 ; lat. 21° 11′ N., long. 157° 17′ W.
Temperature of air at noon, 77°·8 ; mean for the day, 76°·9.
Temperature of water :—

Surface,	76·8	110 fathoms,	55·8
10 fathoms,	76·8	120 „	54·3
20 „	76·4	130 „	53·0
30 „	76·0	140 „	51·8
40 „	75·3	150 „	50·5
50 „	73·9	160 „	49·4
60 „	71·5	170 „	48·3
70 „	68·2	180 „	47·6
80 „	63·7	190 „	46·9
90 „	60·4	200 „	46·3
100 „	57·8	Bottom,	44·0

Density at 60° F. at surface, 1·02565 ; bottom, 1·02542.
Depth, 310 fathoms ; deposit, Volcanic Mud.

At 5 A.M. observed land ahead, the island of Molokai on the left, and Oahu Island in the distance on the right. At 5.45 A.M. proceeded under steam. At 8 A.M. stopped to

Station 260. sound and trawl. Put trawl over. Sounded in 310 fathoms, but no trace of the bottom was obtained. Obtained serial temperatures at intervals of 10 fathoms down to 200 fathoms. At 11 A.M. hove up trawl, which seemed to have fouled something at the bottom as it came up almost empty, containing only a portion of branching coral (*Gorgonia*), and a piece of black volcanic ash; on the iron was a trace of calcareous volcanic mud. Position of Station in strait between Molokai Island and Oahu Island. Proceeded for Honolulu, and at 2.20 P.M. anchored outside Honolulu Harbour in 10 fathoms. At 3.20 P.M. weighed anchor and proceeded into harbour, anchoring at 4 P.M. in 5 fathoms off the town of Honolulu.

Organisms from Surface-Nets. **Surface Organisms.**—The following species are recorded from the surface at this Station:—

Radiolaria (Haeckel, Zool. pt. 40).
Acanthosphæra capillaris, Haeckel.
Icosaspis cruciata, Haeckel.
Sethoconus trochus, Haeckel.
Theopilium tricostatum, Haeckel.
Theocampe cryptoprora, Haeckel.

The tow-nets at the surface procured *Globigerina*, *Orbulina*, and other ordinary oceanic organisms, and in addition large numbers of *Cymbalopora* (*Tretomphalus*) *bulloides*. They were of two different sizes, the smaller ones united into fours by a gelatinous substance. None of these specimens contained sarcode, similar to that found in pelagic Foraminifera, but were filled with swarms of minute ciliated organisms, which crossed the field of the microscope with a rapid rotatory motion; when one of the shells was crushed under a slide, a cloud of these organisms issued from the broken shell. When treated with carmine these little organisms showed a deeply-coloured spot at one end.

The following species are recorded in the Zoological Reports from the surface of the North Pacific, between Japan and the Sandwich Islands, the exact date not being noted:—

Copepoda (Brady, Zool. pt. 23).
Rhincalanus gigas, n.sp.
Euchæta prestandreæ, Philippi.
,, *hessei*, n.sp.
Leuckartia (?) *scopularis*, n.sp.

Amphipoda (Stebbing, Zool. pt. 67).
Paraphronima cuivis, n.sp.
Phronima sp. (?).
Eupronoë sp. (?).
Parapronoë campbelli, n.sp.
Brachyscelus crusculum, Spence Bate.
Oxycephalus clausi, Bovallius (?).

Schizopoda (Sars, Zool. pt. 37).
Stylocheiron abbreviatum, n.g., n.sp.

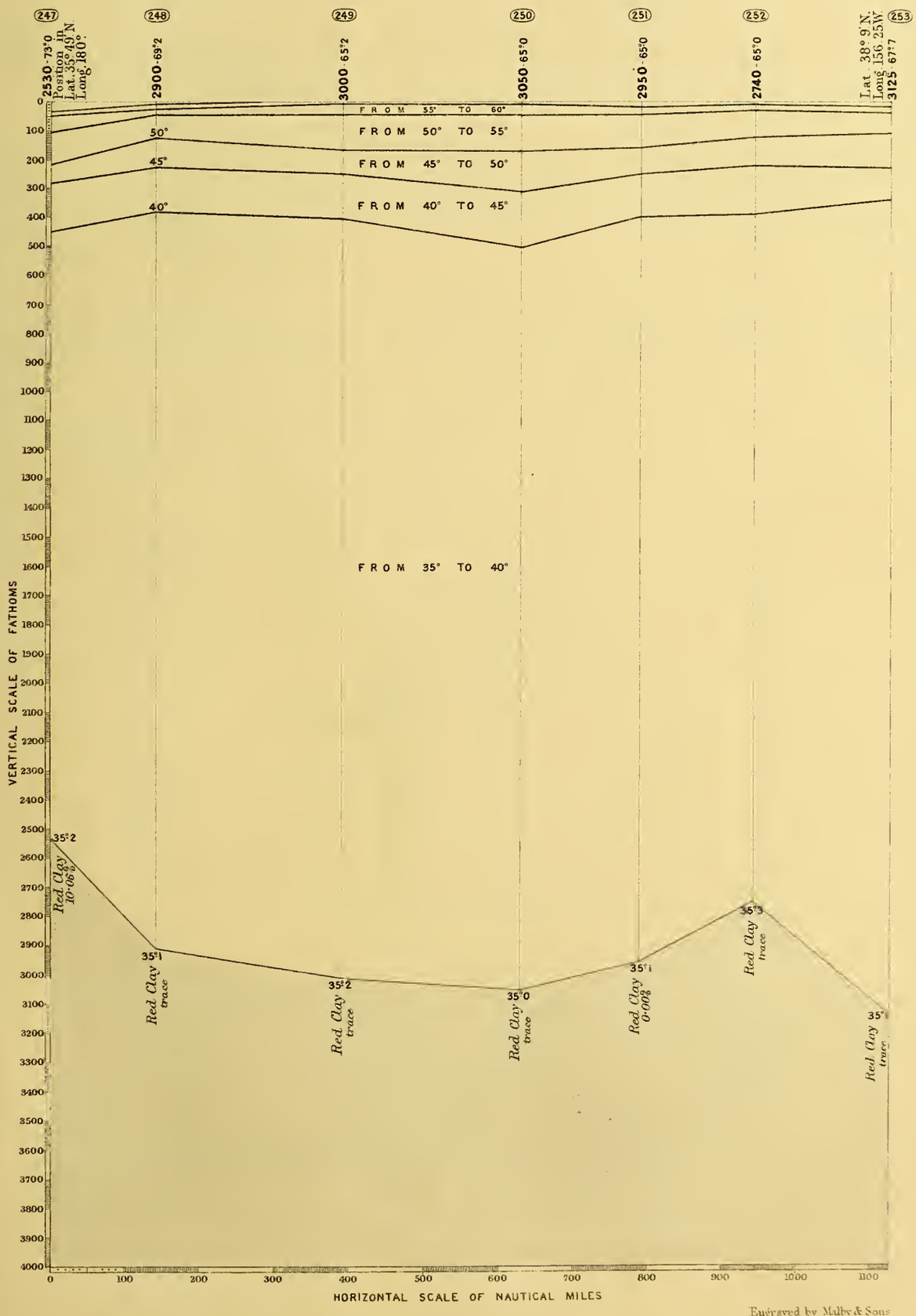
Macrura (Spence Bate, Zool. pt. 52).
Sergestes parvidens, n.sp.
,, *ventridentatus*, n.sp.

PACIFIC OCEAN

Longitudinal Temperature Section

From a Position in Lat. 35° 49′ N. Long. 180° W. to a Position in Lat. 38° 9′ N. Long. 156° 25′ W.

For explanation of Symbols see Appendix 1.



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BRITISH MUSEUM
NATURAL HISTORY

BRACHYURA (Miers, Zool. pt. 49).

Nautilograpsus minutus (Linné).

PELAGIC HEMIPTERA (White, Zool. pt. 19).

Halobates sericeus, Eschscholtz.

NUDIBRANCHIATA (Bergh, Zool. pt. 26). STATION 260.

Glaucus longicirrus, Reinhardt, Bergh (?).

FISHES (Günther, Zool. pt. 78).

Scombresox forsteri, (young).

The Challenger remained at Honolulu from 4 P.M. on July 27 till 9.30 A.M. on August 11, 1875, proceeding thence to Hawaii. During the stay at Honolulu, Mr. Murray was engaged several days dredging from the steam pinnace outside the reefs in depths of 8 to 40 fathoms. AT HONOLULU.

Station 261 (Sounding 403), between Oahu and Hawaii Islands, Sandwich Islands (see Chart 37 and Diagram 19). STATION 261.

August 12, 1875 ; lat. 20° 18′ N., long. 157° 14′ W.
Temperature of air at noon, 78°·5 ; mean for the day, 77°·8.
Temperature of water :—

Surface,	78·5	180 fathoms,	47·4
10 fathoms,	75·6	190 „	47·0
20 „	75·3	200 „	46·6
30 „	74·9	300 „	42·6
40 „	73·1	400 „	40·8
50 „	70·9	500 „	39·7
60 „	68·3	600 „	38·8
70 „	66·0	700 „	38·0
80 „	63·7	800 „	37·3
90 „	61·4	900 „	36·9
100 „	59·0	1000 „	36·4
110 „	56·9	1100 „	36·1
120 „	55·0	1200 „	35·9
130 „	53·0	1300 „	35·7
140 „	51·3	1400 „	35·4
150 „	50·0	1500 „	35·2
160 „	49·1	Bottom,	35·2
170 „	48·2		

Density at 60° F. :—

Surface,	1·02586	200 fathoms,	1·02528
25 fathoms,	1·02566	300 „	1·02525
50 „	1·02583	800 „	1·02528
100 „	1·02566	Bottom,	1·02577

Depth, 2050 fathoms ; deposit, Volcanic Mud.

Station 261.

Several brilliant meteors were observed between midnight and 4 A.M. At 7.30 A.M. shortened and furled sails, and proceeded under steam. At 9 A.M. sounded in 2050 fathoms. No sample of the bottom was brought up in the sounding-tube, but a trace of reddish mud adhered to the outside of the tube. Took serial temperatures down to 1500 fathoms. At 12.30 P.M. completed temperature observations, and proceeded under steam against a heavy sea and strong easterly breeze.

Point Upoloa distant at noon, 79 miles. Made good 68 miles. Amount of current 14 miles, direction S. 82° W.

Organisms from Surface-Nets.

Surface Organisms.—The following are recorded in the note-books from the surface and down to a depth of 20 fathoms:—*Ceratium* (*Peridinium*) *tripos* (*in catena*), *Pyrocystis* (two forms), *Ethmodiscus*, *Coscinodiscus*, and other Diatoms, Oscillatoriaceæ, *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina*, Acanthometræ and other Radiolaria abundant, Medusæ, Siphonophoræ, Echinoderm larvæ, *Sagitta*, Annelid larvæ, *Saphirina*, *Copilia*, *Setella*, Hyperids, *Euphausia*, *Lucifer*, larval Lamellibranchs and Gasteropods, *Echinospira*, *Atlanta*, *Pterotrachea*, Pteropods and larvæ, *Appendicularia*, *Doliolum*.

At Hawaii.

The Challenger anchored in Hilo Bay, Hawaii, at 7 A.M. on August 14, remaining there till 2 P.M. on August 19, when she proceeded on her voyage towards Tahiti.

Animals from Sandwich Islands.

The following species are recorded in the Zoological Reports as having been obtained during the stay of the Challenger at the Sandwich Islands in shallow water and on shore; the deposit off the reefs at Honolulu in 20 to 40 fathoms was a Coral Sand containing 88·64 per cent. of carbonate of lime, and the deposits in Honolulu Harbour, 4½ fathoms, and in Hilo Bay, 6 fathoms, were Volcanic Muds containing respectively 10 and 5 per cent. of carbonate of lime (for description of the islands see *Narr. Chall. Exp.*, vol. i. pp. 759–769):—

Keratosa (Polejaeff, Zool. pt. 31).

Coscinoderma denticulatum, n.sp. One specimen (Honolulu reefs, 40 fathoms); obtained at no other locality.

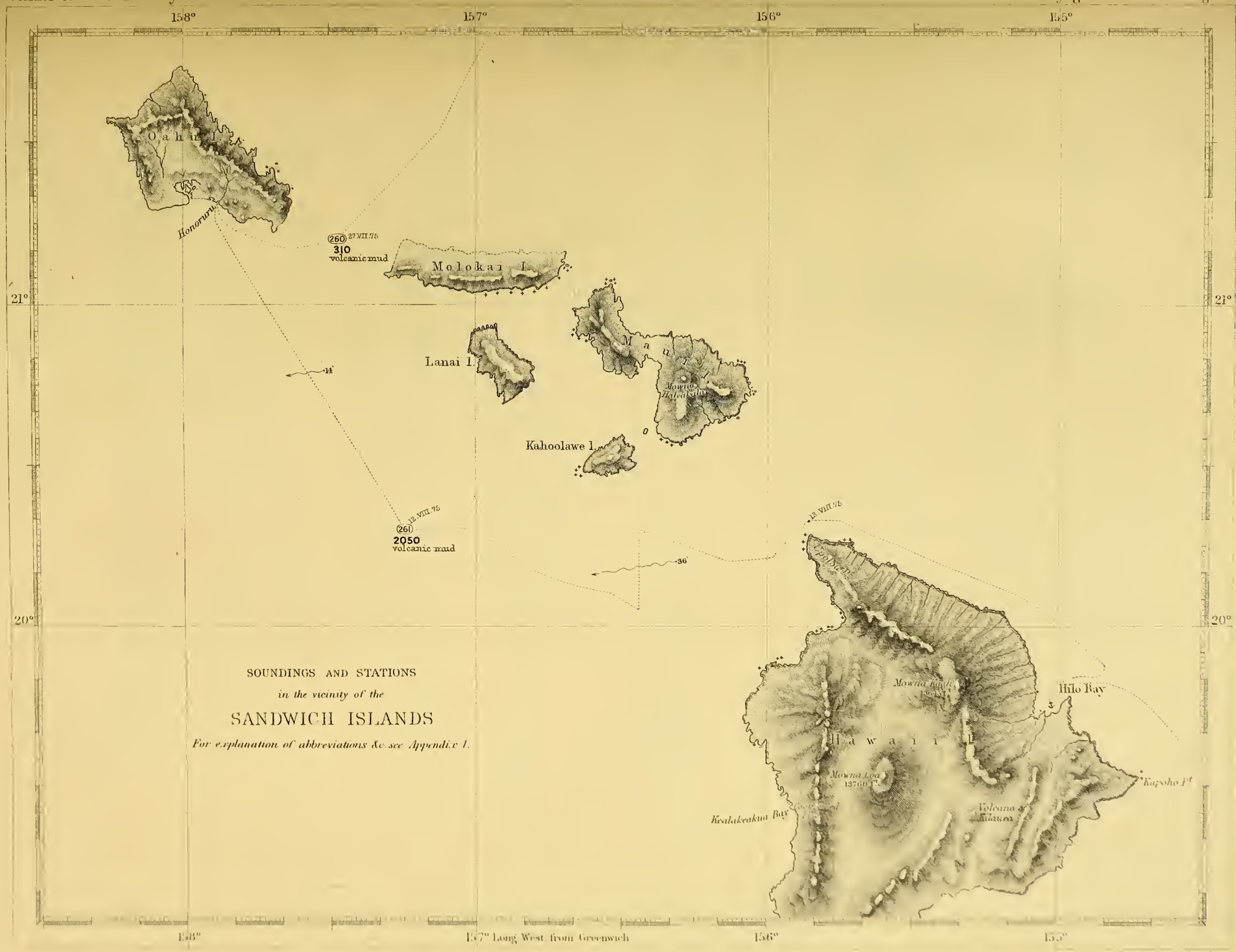
Monaxonida (Ridley and Dendy, Zool. pt. 59).

Esperiopsis anomala, n.sp. Two specimens (Honolulu, 16 to 20 fathoms); obtained at no other locality.

Reef Corals (Quelch, Zool. pt. 46).

Pocillopora cespitosa, Dana. (Honolulu reefs, 1 to 2 fathoms); obtained also at Tahiti.

" *ligulata*, Dana. Two specimens (Honolulu); obtained at no other locality by the Challenger.



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Pocillopora plicata, Dana. Two specimens and fragments (Honolulu, reefs and 1 to 2 fathoms); obtained at no other locality by the Challenger.

„ *nobilis*, Verrill. Two specimens and fragments (Honolulu reefs, 10 to 40 fathoms); obtained at no other locality by the Challenger.

„ *verrucosa* (Ellis and Solander). One specimen and fragments (Honolulu, reefs and 1 to 2 fathoms); obtained at no other locality by the Challenger.

Stephanaria stellata, Verrill. One specimen (Honolulu); obtained also at Fiji.

Montipora verrucosa (Lamarck). A few specimens (Honolulu, reefs and 1 to 2 fathoms); obtained at no other locality by the Challenger.

„ *capitata* (Dana). A few specimens (Honolulu, reefs and 1 to 40 fathoms); obtained at no other locality by the Challenger.

Porites bulbosa, n.sp. One specimen (Honolulu reefs, 1 to 2 fathoms); obtained at no other locality.

„ *compressa*, Dana. One specimen (Honolulu); obtained at no other locality by the Challenger.

„ *lichen*, Dana. One specimen and fragments (Honolulu, reefs and 1 to 40 fathoms); obtained at no other locality by the Challenger.

„ *tenuis*, Verrill. (Honolulu, 1 to 2 fathoms); obtained also at New Hebrides.

Hydroida (Allman, Zool. pt. 70).

Campanularia retroflexa, n.sp. One specimen (Honolulu, 20 to 40 fathoms); obtained at no other locality.

Cryptolaria pulchella, n.sp. Several specimens (Honolulu, 20 to 40 fathoms); obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophionereis porrecta, Lyman. (Honolulu reefs); obtained at no other locality by the Challenger.

Ophiocoma erinaceus, Müller and Troschel. (Honolulu reefs); obtained also at Philippines.

Echinoidea (Agassiz, Zool. pt. 9).

Phyllacanthus gigantea, Agassiz. (Honolulu reefs); obtained at no other locality by the Challenger.

Echinothrix turcarum (Schynv.). (Honolulu); obtained also at Fiji.

Astropyga pulvinata (Lamarck). (Honolulu, 18 fathoms); obtained also at Stations 188 and 190.

Echinometra lucunter (Leske). (Honolulu); for distribution see Tongatabu.

Toxopneustes pileolus (Lamarck). (Honolulu); obtained also at Philippines.

Sandwich Islands.

Holothurioidea (Théel, Zool. pt. 39).

Stichopus godeffroyi, Semper, var. One specimen (Sandwich Islands); obtained at no other locality by the Challenger. Recorded from Navigator, Friendly, Fiji, and Pelew Islands.

Holothuria fusco-rubra, n.sp. One specimen (Sandwich Islands); obtained at no other locality.

Ostracoda (Brady, Zool. pt. 3).

Pontocypris faba (Reuss) (?). (Honolulu reefs, 40 fathoms); obtained also at Station 162.

Bairdia amygdaloides, Brady. (Honolulu reefs, 40 fathoms); for distribution see Station 162.

,, *crosskeiana*, Brady. (Honolulu reefs, 40 fathoms); obtained also at Tongatabu and Admiralty Islands.

,, *expansa*, n.sp. (Honolulu reefs, 40 fathoms); obtained at no other locality.

,, *attenuata*, n.sp. (Honolulu reefs, 40 fathoms); obtained also at Station 185.

Cythere flos-cardui, n.sp. (Honolulu reefs, 40 fathoms); obtained at no other locality.

,, *reussi*, Brady. (Honolulu reefs, 40 fathoms); obtained also at Stations 187 and 313.

,, *rastromarginata*, n.sp. (Honolulu reefs, 40 fathoms); obtained also at Stations 162 and 167.

,, *quadriaculeata*, n.sp. (Honolulu reefs, 40 fathoms); obtained also at Station 233B.

,, *convoluta*, Brady. (Honolulu reefs, 40 fathoms); obtained also at Station 172.

Loxoconcha honoluliensis, n.sp. (Honolulu reefs, 40 fathoms); obtained at no other locality.

,, *alata*, Brady. (Honolulu reefs, 40 fathoms); obtained at no other locality by the Challenger. Recorded from Mauritius.

,, *anomala*, n.sp. (Honolulu reefs, 40 fathoms); obtained at no other locality.

Xestoleberis curta, Brady. (Honolulu reefs, 40 fathoms); for distribution see Station 33.

Cytherella venusta, n.sp. (Honolulu reefs, 40 fathoms); obtained at no other locality.

Stomatopoda (Brooks, Zool. pt. 45).

Squilla nepa, Latreille. One specimen (Honolulu reefs); obtained also at Japan.

Pseudosquilla ciliata, Miers. One specimen (Honolulu reefs); obtained also at St. Thomas.

Protosquilla guérinii (White). One specimen (Honolulu); obtained at no other locality by the Challenger. Recorded from Fiji. SANDWICH ISLANDS.

MACRURA (Spence Bate, Zool. pt. 52).

Alpheus lævis, Randall. One specimen (Honolulu reefs); obtained at no other locality by the Challenger. Recorded from Sandwich Islands, Fiji, Tahiti, Australia, and Nicobars.

„ *prolificus*, n.sp. One specimen (off Honolulu, 18 fathoms); obtained at no other locality.

Atya bisulcata (Randall). One hundred specimens (Honolulu); obtained at no other locality by the Challenger. Recorded from Sandwich Islands and Seychelles.

Bithynis grandimanus (Dana). Fifty specimens (Honolulu, from rivers); obtained at no other locality by the Challenger.

BRACHYURA (Miers, Zool. pt. 49).

Carpilius maculatus (Linné). One specimen (Honolulu reefs); obtained at no other locality by the Challenger.

Lophactæa granulosa (Rüppell). One specimen (Honolulu reefs); obtained at no other locality by the Challenger.

Actæa nodulosa, White. One specimen (Honolulu reefs); obtained at no other locality by the Challenger. Recorded from Mauritius.

Etisus lævimanus, Randall. One specimen (Honolulu reefs); obtained also at Tongatabu.

Trapezia rufopunctata (Herbst). One specimen (Honolulu, 18 fathoms); obtained also at Philippines.

„ „ var. *intermedia*, nov. Three specimens (Honolulu reefs); obtained at no other locality.

Neptunus (*Neptunus*) *sanguinolentus* (Herbst). Many specimens (Honolulu and Hawaii); obtained also at Port Jackson and Ternate.

Thalamita integra, Dana. Several specimens (Honolulu, reefs and market); obtained at no other locality by the Challenger.

Podophthalmus vigil (Fabricius). One specimen (Honolulu reefs); obtained at no other locality by the Challenger. Recorded from Indo-Pacific region.

Metopograpsus messor (Forskal), var. *frontalis*, nov. Several specimens (Hilo, beach); obtained also at Tahiti.

Calappa hepatica (Linné). Two specimens (Honolulu reefs); obtained also at Tongatabu and Amboina.

SANDWICH ISLANDS.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Ervilia bisculpta, Gould. (Honolulu reefs); obtained also at Port Jackson.

,, *sandwichensis*, n.sp. Single valve (Honolulu, 40 fathoms); obtained at no other locality.

Circe jucunda, n.sp. Three valves (Honolulu, 40 fathoms); obtained also at Station 188.

Lucina (*Codakia*) *hawaiiensis*, n.sp. One specimen and odd valve (Honolulu, 40 fathoms); obtained at no other locality.

Julia exquisita, Gould. Two valves (Honolulu, 40 fathoms); obtained at no other locality by the Challenger. Recorded from Sandwich and Bourbon Islands.

Perna samoensis, Baird. (Honolulu reefs); obtained also at Philippines.

,, *vitrea*, Reeve. (Hilo); obtained at no other locality by the Challenger. Recorded from Sandwich Islands.

SCAPHOPODA and GASTEROPODA (Watson, Zool. pt. 42).

Siphodentalium honoluluense, n.sp. (Honolulu, 40 fathoms); obtained at no other locality.

Trochus sp. (?). (Honolulu, 40 fathoms).

Cyclostrema sp. (?). (Honolulu, 40 fathoms).

Phasianella sp. (?). (Honolulu, 40 fathoms).

Columbella (*Zafra*) *troglodytes*, Souverbie. (Honolulu, 40 fathoms); obtained also at Station 186 and Fiji.

Marginella, two species undetermined. (Honolulu, 40 fathoms).

Conus (*Puncticulis*) *pulicarius*, Hwass. (Honolulu reefs); obtained at no other locality by the Challenger. Recorded from Indian and Pacific Oceans.

Cypræa (*Trivia*) *pellucidula*, Gaskoin. (Honolulu, 40 fathoms); obtained at no other locality by the Challenger. Recorded from South Pacific and Torres Strait.

Strebloceras subannulatum, De Folin, n.sp. Three specimens (Honolulu, 40 fathoms); obtained at no other locality.

Cæcum sepimentum, De Folin. Many specimens (Honolulu, 40 fathoms); obtained also at Tongatabu and Tahiti (var.).

,, n.sp. (?). One broken specimen (Honolulu, 40 fathoms).

,, *crystallinum*, De Folin, n.sp. One specimen (Honolulu, 40 fathoms); obtained at no other locality.

Odostomia scopulorum, n.sp. Several specimens (Honolulu, 40 fathoms); obtained also at Station 188 (?).

Odostomia kymatodes, n.sp. (?). One specimen (Honolulu, 40 fathoms); obtained also at Flinders Passage. SANDWICH ISLANDS.

„ , various species undetermined. (Honolulu, 40 fathoms).

Eulima acanthyllis, n.sp. (Honolulu, 40 fathoms); obtained at no other locality.

„ , two other species undetermined. (Honolulu, 40 fathoms).

Cerithiopsis turrigera, n.sp. (Honolulu, 40 fathoms); obtained at no other locality.

„ , two other species undetermined. (Honolulu, 40 fathoms).

Bittium perparvulum, n.sp. (Honolulu, 40 fathoms); obtained also at Stations 172, 186, and Torres Strait.

„ *leucocephalum*, n.sp. One specimen (Honolulu reefs); obtained at no other locality.

Triforis, two species undetermined. (Honolulu, 40 fathoms).

Alaba (*Styliferina*) *goniochila*, Adams. (Honolulu, 40 fathoms); obtained also at Stations 186, 187, and Flinders Passage.

Litorina pintado (Wood). (Hilo, shore); obtained at no other locality by the Challenger. Recorded from Sandwich Islands, Indian Ocean, and Polynesia.

Barleeia imbricata, n.sp. (Honolulu, 40 fathoms); obtained also at Station 186, Torres Strait, and Fiji.

Rissoa (*Cingula*) *scopulorum*, n.sp. (Honolulu, 40 fathoms); obtained at no other locality.

„ , three other species undetermined. (Honolulu, 40 fathoms).

Rissoina ephamilla [*scalariformis*], n.sp. (Honolulu, 40 fathoms); obtained at no other locality.

„ *honoluluensis*, n.sp. (Honolulu, 40 fathoms); obtained at no other locality.

Scaliola arenosa, Adams. (Honolulu, 40 fathoms); obtained also at Stations 185, 186, 187, and Torres Strait.

„ *bella*, Adams. (Honolulu, 40 fathoms); obtained also at Stations 172, 185, 186, 187, and Torres Strait.

„ *caledonica*, Crosse. (Honolulu, 40 fathoms); obtained also at Stations 186, 187, and Torres Strait.

Atys sp. (?). (Honolulu, 40 fathoms).

Amphisphyra sp. (?). (Honolulu, 40 fathoms).

Utriculus (*Tornatina*), two species undetermined. (Honolulu, 40 fathoms).

Cylichna, two species undetermined. (Honolulu, 40 fathoms).

Lachesis (?) sp. (Honolulu, 40 fathoms).

NUDIBRANCHIATA (Bergh, Zool. pt. 26).

Doriopsis nebulosa, Pease (?). One specimen (Honolulu reefs); obtained at no other locality by the Challenger. Recorded from Pacific.

Sandwich Islands.

Cephalopoda (Hoyle, Zool. pt. 44).

Octopus marmoratus, n.sp. Three specimens (Honolulu reefs); obtained at no other locality.

Polyzoa (Busk, Zool. pts. 30 and 50; Waters, pt. 79).

Scrupocellaria ornithorhynchus (Wyville Thomson). (Honolulu, 20 to 40 fathoms); obtained at no other locality by the Challenger.

Steganoporella magnilabris (Busk). (Honolulu, 20 to 40 fathoms); obtained at no other locality by the Challenger. Recorded from Australia, Tongatabu, and Gulf of Florida. Fossil—Australia.

Retepora denticulata, n.sp. (Honolulu, 20 to 40 fathoms); obtained at no other locality.

,, *contortuplicata*, n.sp. (Honolulu, 20 to 40 fathoms); obtained at no other locality.

Chorizopora honolulensis, n.sp. (Honolulu, 20 to 40 fathoms); obtained at no other locality.

Smittia marsupialis, n.sp. (Honolulu, 20 to 40 fathoms); obtained also at Station 313, 55 fathoms.

Mucronella delicatula, n.sp. (Honolulu, 20 to 40 fathoms); obtained at no other locality. [Waters calls it *Smittia delicatula* (Busk)].

,, *magnifica*, n.sp. (Honolulu, 20 to 40 fathoms); obtained at no other locality.

Schizoporella furcata, n.sp. (Honolulu, 20 to 40 fathoms); obtained at no other locality.

,, *tenuis*, n.sp. (Honolulu, 20 to 40 fathoms); obtained also at the Cape.

Myriozoum honolulense, n.sp. (Honolulu, 20 to 40 fathoms); obtained at no other locality.

Cellepora honolulensis, n.sp. (Honolulu, 20 to 40 fathoms); obtained at no other locality.

,, *polymorpha*, n.sp. (Honolulu, 20 to 40 fathoms); obtained at no other locality.

,, *vagans*, n.sp. (Honolulu, 20 to 40 fathoms); obtained also at Station 148.

Idmonea radians (Lamarck). (Honolulu, 20 to 40 fathoms); obtained also at Station 172.

Fishes (Günther, Zool. pts. 6 and 78).

Zygæna malleus, Risso. (Honolulu reefs); obtained also at Tongatabu.

Dules marginatus, C.V. (Honolulu reefs and Hilo); obtained also at Fiji and Tahiti.

Scorpæna nuchalis, Günther. (Honolulu reefs); obtained at no other locality by the Challenger. Recorded from Rarotonga.

Cirrhites arcatus, C.V. (Honolulu reefs); obtained at no other locality by the Challenger.

Cirrhitichthys maculatus, Lac. (Honolulu reefs); obtained at no other locality by the Challenger.

Caranx crumenophthalmus, Bl. (Honolulu reefs); obtained also at Admiralty Islands and Cape Verdes.

„ *hippos*, Linné. (Hilo); obtained at no other locality by the Challenger.

Acanthurus blochi, C.V. (Honolulu reefs); obtained also at Fiji and Admiralty Islands.

Upeneus trifasciatus, Lac. (Honolulu reefs); obtained at no other locality by the Challenger.

Polynemus sexfilis, C.V. (Hilo); obtained at no other locality by the Challenger.

Gobius stamineus, Valenciennes. (Honolulu and Hawaii, fresh water); obtained at no other locality by the Challenger.

„ *sandvicensis*, n.sp. (Honolulu, fresh water); obtained at no other locality.

Eleotris fusca, Bl. Schn. (Honolulu, fresh water); obtained also at Fiji and Tahiti.

Sicydium nigrescens, n.sp. (Honolulu and Hawaii, fresh water); obtained at no other locality.

Lentipes concolor, Gill. (Hawaii, fresh water); obtained at no other locality by the Challenger.

„ *seminudus*, n.sp. (Honolulu, fresh water); obtained at no other locality.

Mugil dobula, Günther. (Hilo, shore); obtained at no other locality by the Challenger.

Dascyllus albisella, Gill. (Honolulu reefs); obtained at no other locality by the Challenger.

Julis obscura, n.sp. Four specimens (Honolulu); obtained at no other locality.

Rhomboidichthys pantherinus, Rüpp. (Honolulu reefs); obtained at no other locality by the Challenger.

Chanos salmoneus, Forst. (Honolulu reefs); obtained at no other locality by the Challenger.

Albula conorhynchus, Bl. Schn. (Hilo); obtained at no other locality by the Challenger.

Conger marginatus, Val. (Honolulu reefs); obtained also at Japan.

Muræna flavo-marginata, Rüpp. (Honolulu reefs); obtained at no other locality by the Challenger.

„ (?) sp. (Honolulu reefs).

Doryichthys pleurotænia, n.sp. (Honolulu, 18 fathoms); obtained at no other locality.

Sandwich Islands.

Balistes buniva, Lac. (Honolulu reefs); obtained also at Ascension and St. Paul's Rocks.

Exocoetus simus, C.V. (Honolulu); obtained at no other locality by the Challenger. Recorded from Sandwich Islands.

In the foregoing list 157 species of invertebrates and fishes are enumerated, of which 52 are new to science; 40 of the new species were not obtained elsewhere.

Organisms from the Deposit.

Foraminifera (Brady, Zool. pt. 22).—The following species of Foraminifera were observed in the deposit from 40 fathoms off Honolulu reefs; the pelagic species, which make up about 3 per cent. of the carbonate of lime present in the deposit, are marked thus × :—

Nubecularia inflata, Brady.
Biloculina ringens (Lamarck), var. *denticulata*, Brady.
Spiroloculina convexiuscula, Brady.
„ *crenata*, Karrer.
„ *excavata*, d'Orbigny.
„ *grata*, Terquem.
„ *nitida*, d'Orbigny.
„ *planulata* (Lamarck).
Miliolina alveoliniformis, Brady.
„ *bicornis* (Walker and Jacob).
„ *curieriana* (d'Orbigny).
„ *ferussacii* (d'Orbigny).
„ *labiosa* (d'Orbigny).
„ *linnæana* (d'Orbigny).
„ *macilenta*, Brady.
„ *oblonga* (Montagu).
„ *parkeri*, Brady.
„ *reticulata* (d'Orbigny).
„ *secans* (d'Orbigny).
„ *seminulum* (Linné).
„ *subrotunda* (Montagu).
„ *trigonula* (Lamarck).
„ *undosa* (Karrer).
Articulina conico-articulata (Batsch).
„ *sagra*, d'Orbigny.
sulcata (Reuss).
Vertebralina striata, d'Orbigny.
Peneroplis pertusus (Forskål).
Orbitolites complanata (Lamarck).
„ *marginalis* (Lamarck).
Alveolina boscii (Defrance).
„ *melo* (Fichtel and Moll).
Reophax dentaliniformis, Brady.
„ *scorpiurus*, Montfort.
Haplophragmium canariense (d'Orbigny).
Textularia folium (Parker and Jones).
„ *gramen*, d'Orbigny.
„ *siphonifera*, Brady.
Verneuilina spinulosa, Reuss.
Chrysalidina dimorpha, Brady.
Pavonina flabelliformis, d'Orbigny.
Bolivina limbata, Brady.
„ *textilarioides*, Reuss.
Cassidulina crassa, d'Orbigny.
Lagena globosa (Montagu).
„ *hexagona* (Williamson).
„ *marginata* (Walker and Boys).
„ *striata* (d'Orbigny).
Nodosaria proxima, Silvestri.
Lingulina carinata, d'Orbigny.
Frondicularia robusta, Brady.
Cristellaria crepidula (Fichtel and Moll).
Polymorphina regina, Brady, Parker, and Jones.
Uvigerina asperula, Czjzek.
„ *pygmæa*, d'Orbigny.
Sagrina annulata, Brady.
„ *raphanus*, Parker and Jones.
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *rubra*, d'Orbigny.
× *Orbulina universa*, d'Orbigny.
Spirillina inæqualis, Brady.
„ *tuberculata*, Brady.
„ *vivipara*, Ehrenberg.
Cymbalopora poeyi (d'Orbigny).
„ *tabellæformis*, Brady.
× „ (*Tretomphalus*) *bulloides* (d'Orbigny).
Discorbina patelliformis, Brady.
„ *rosacea* (d'Orbigny).

Discorbina tabernacularis, Brady.
Planorbulina larvata, Parker and Jones.
Truncatulina echinata, Brady.
„ *lobatula* (Walker and Jacob).
„ *variabilis*, d'Orbigny.
Carpenteria monticularis, Carter.
× *Pulvinulina menardii* (d'Orbigny).
„ *repanda* (Fichtel and Moll).
Rotalia beccarii (Linné).

Gypsina vesicularis (Parker and Jones).
Polytrema miniaceum (Linné).
Nonionina scapha (Fichtel and Moll).
Polystomella craticulata (Fichtel and Moll).
„ *striatopunctata* (Fichtel and Moll).
Amphistegina lessonii, d'Orbigny.
Operculina complanata (Defrance).
„ „ var. *granulosa*, Leymerie.
Heterostegina depressa, d'Orbigny.

SANDWICH ISLANDS.

Surface Organisms—The following species are recorded from the surface in the neighbourhood of the Sandwich Islands :— ORGANISMS FROM SURFACE-NETS.

ANNELIDA (M'Intosh, Zool. pt 34).
Alciopa (?) *quadrioculata*, n.sp.
Alciopa (?) sp.
Greeffia oahuensis, n.sp.

COPEPODA (Brady, Zool. pt. 23).
Scolecithrix danæ (Lubbock).
Candace pachydactyla, Dana.
Acartia denticornis, n.sp.
Pontella plumata (Dana).
Oithona challengeri, n.sp.
Lubbockia squillimana, Claus.
Oncæa obtusa (Dana).
Saphirina ovalis, Dana.
„ *metallina*, Dana.

During the stay at Honolulu the tow-net yielded mostly the usual oceanic things, except when quite near the reefs, where there were very many Zoëæ of crabs, pieces of sea-weeds, and fine sediment containing many small Infusoria. In Pearl Harbour a *Daphnia* or *Evadne* was found. *Cymbalopora* (*Tretomphalus*) *bulloides* was always abundant.

Willemoes-Suhm writes: "The principal surface animals in Honolulu Harbour were *Sagitta* and *Corycæus*, among which were several Zoëæ of *Squilla* evidently just escaped from the eggs, representing an earlier stage than those met with in the open sea. The surface in Hilo Bay swarmed with small things, principally minute Copepods, along with some Annelid larvæ, and Brachyurous Zoëæ."

Station 262 (Sounding 404), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19). STATION 262.

August 20, 1875; lat. 19° 12′ N., long. 154° 14′ W.
Temperature of air at noon, 77°·8; mean for the day, 76°·1.

Station 262.

Temperature of water :—

Surface,	77·5°	180 fathoms,	47·2°
10 fathoms,	77·4	190 „	46·7
20 „	77·2	200 „	46·2
30 „	77·0	300 „	44·1
40 „	76·3	400 „	42·9
50 „	75·0	500 „	41·3
60 „	73·0	600 „	39·9
70 „	70·5	700 „	38·5
80 „	67·5	800 „	37·5
90 „	64·3	900 „	36·5
100 „	61·5	1000 „	35·9
110 „	59·0	1100 „	35·4
120 „	56·5	1200 „	35·2
130 „	54·2	1300 „	35·2
140 „	52·2	1400 „	35·2
150 „	50·3	1500 „	35·2
160 „	49·0	Bottom,	35·2
170 „	48·0		

Density at 60° F. :—

Surface,	1·02585	300 fathoms,	1·02522
25 fathoms,	1·02557	400 „	1·02527
50 „	1·02554	800 „	1·02554
100 „	1·02566	Bottom,	1·02569
200 „	1·02530		

Depth, 2875 fathoms; deposit, Volcanic Mud, containing no carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.45 A.M. shortened and furled sails. At 5.10 A.M. proceeded under steam. At 5.30 A.M. stopped and sounded in 2875 fathoms. Obtained a series of temperatures down to 1500 fathoms. At 11.30 A.M. made all plain sail. Several boatswain birds were seen.

Point Venus, Tahiti, distant at noon, 2217 miles. Made good 54 miles. Amount of current 13 miles, direction S. 8° E.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Acanthosphæra capillaris, Haeckel.
Icosaspis cruciata, Haeckel.
Sethoconus trochus, Haeckel.
„ *pileus*, Haeckel.
Theopilium tricostatum, Haeckel.
Theocampe cryptoprora, Haeckel.

Fishes (Günther, Zool. pt. 78).

Echeneis remora, Linné. (From shark).

In addition, the following are recorded in the note-books:—*Pyrocystis*, Diatoms, *Globigerina*, *Hastigerina*, *Pulvinulina*, *Cymbalopora* (*Tretomphalus*) *bulloides*, Annelid larvæ, Copepods, *Lucifer*, *Appendicularia*, and *Doliolum*. Two sharks (*Carcharias*) were caught, having *Caligus* and *Echeneis* attached. STATION 262.

Station 263 (Sounding 405), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19). STATION 263.

August 21, 1875; lat. 17° 33′ N., long. 153° 36′ W.

Temperature of air at noon, 78°·3; mean for the day, 76°·5.

Temperature of water:—

	°		°
Surface,	77·5	180 fathoms,	47·3
10 fathoms,	77·5	190 „	47·0
20 „	77·2	200 „	46·7
30 „	76·9	300 „	43·7
40 „	76·0	400 „	41·3
50 „	73·5	500 „	39·5
60 „	69·3	600 „	38·7
70 „	65·5	700 „	38·2
80 „	62·2	800 „	37·8
90 „	59·5	900 „	37·4
100 „	57·2	1000 „	37·0
110 „	55·5	1100 „	36·6
120 „	53·8	1200 „	36·3
130 „	52·5	1300 „	36·0
140 „	51·1	1400 „	35·7
150 „	49·9	1500 „	35·4
160 „	48·9	Bottom,	35·1
170 „	48·0		

Density at 60° F.:—

Surface,	1·02593	2000 fathoms,	1·02533
400 fathoms,	1·02539	2550 „	1·02536
1000 „	1·02542	Bottom,	1·02544

Depth, 2650 fathoms; deposit, Volcanic Mud, containing no carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. furled sails. At 6.30 A.M. sounded in 2650 fathoms. At 7 A.M. put trawl over with tow-net attached and a tow-net at the weights, and veered 3150 fathoms. Obtained serial temperatures down to 1500 fathoms. At 1 P.M. commenced heaving in trawl, which came up empty at 3.45 P.M., having apparently never reached the bottom. At 4 P.M. made all plain sail. Boatswain birds and gannets (?) were seen.

Point Venus, Tahiti, distant at noon, 2116 miles. Made good 103 miles. Amount of current 10 miles, direction S. 60° W.

Station 263. Organisms from the Deposit.

Radiolaria (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station :—

Thecosphæra dodecactis, Haeckel.
Solenosphæra megalactis, Haeckel.
Xanthiosphæra capillacea, Haeckel.
,, *lappacea*, Haeckel.
Hexacromyum octahedrum, Haeckel.
Lithocyclia heteropora, Haeckel.
Amphiactura amphibrachia, Haeckel.
Archidiscus tetroniscus, Haeckel.
Tripodictya tribelonia, Haeckel.
Stylodictya centrospira, Haeckel.
Amphirrhopalum amphidiscanum, Haeckel.
Pentalastrum astropecten, Haeckel.
Larcidium octacanthum, Haeckel.
Larnacalpis triaxonia, Haeckel.
Larnacantha hexacantha, Haeckel.
,, *prismatica*, Haeckel.
Trizonium hexabelonium, Haeckel.
Zonuscus octacanthus, Haeckel.
Streblonia pulvinulina, Haeckel.
Zygocircus dodecanthus, Haeckel.
Clathrocircus multiforis, Haeckel.
Coronidium dyostephanus, Haeckel.
Parastephanus circularis, Haeckel.
Dipospyris forcipata, Haeckel.
Tholospyris galeata, Haeckel.
Nephrospyris cordata, Haeckel.
Cannobotrys cortina, Haeckel.
Psilomelissa calvata, Haeckel.
Lychnocanium lanterna, Haeckel.
Sethophormis aurelia, Haeckel.
Sethopyramis spinosa, Haeckel.
Anthocyrtium adonis, Haeckel.
,, *hispidum*, Haeckel.
Sethocyrtis oxycephalis, Haeckel.
Sethocorys patrocli, Haeckel.
Sethocapsa pyriformis, Haeckel.
Dictyoceras insectum, Haeckel.
Pterocanium orcinum, Haeckel.
Podocyrtis scaphopodia, Haeckel.
Dictyopodium eurylophus, Ehrenberg.
Theopera fusiformis, Haeckel.
Rhopalocanium lasanum, Haeckel.
Rhopalatractus fusiformis, Haeckel.
Alacorys dodecantha, Haeckel.
Cycladophora pantheon, Haeckel.
Clathrocyclas domina, Haeckel.
Hexalatractus sexalatus, Haeckel.
Theocyrtis microtheca, Haeckel.
Theosyringium tibia, Haeckel.
Theocorys ovata, Haeckel.
Theocampe sphærothorax, Haeckel.
Theocapsa darwinii, Haeckel.
Artopilium longicorne, Haeckel.
Lithomitra nodosaria, Haeckel.
Orosphæra clavigera, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Acanthosphæra capillaris, Haeckel.
Xiphatractus glyptodon, Haeckel.
Trizonium constrictum, Haeckel.
Tetrapyle circularis, Haeckel.
Belonostaurus bicuspis, Haeckel.
Icosaspis cruciata, Haeckel.
Dorypelta tessaraspis, Haeckel.
Plagoniscus tripodiscus, Haeckel.
Protympanium primordiale, Haeckel.
Carpocanium irregulare, Haeckel.
Sethoconus trochus, Haeckel.
Sethoconus pileus, Haeckel.
Theopilium tricostatum, Haeckel.
Theocampe cryptoprora, Haeckel.
Cannobelos calymmata, Haeckel.
Sagoscena debilis, Haeckel.
Sagmidium tricorne, Haeckel.
Gazelletta robusta, Haeckel.
Gorgonetta bisenaria, Haeckel.
Castanidium willemoesi, Haeckel.

Macrura (Spence Bate, Zool. pt. 52).

Sergestes oculatus, Krøyer.

In addition, the following are recorded in the note-books:—Oscillatoriaceæ, *Pyrocystis* (two forms), Diatoms (some attached to Copepods), *Globigerina*, *Orbulina*, *Pulvinulina*, Medusæ, *Diphyes* and other Siphonophoræ, Echinoderm larvæ, *Sagitta*, *Alciopa*, Aphroditacean and other Annelid larvæ, *Cypridina*, *Copilia*, *Calanus*, *Saphirina*, and other Copepods, Phronimids, Hyperids, *Euphausia* with eggs, *Oxygyrus*, *Pterotrachea*, *Tiedemannia* [= *Gleba*] and other Pteropods and larvæ, *Appendicularia*, *Doliolum*. The yellow cells (zooxanthellæ) in *Orbulina* and *Globigerina* were observed moving about with the sarcode, and the nucleus in each coloured when treated with carmine. A tow-net was sent down on the trawl and one at the weights, and brought up many specimens of Phæogromia and other Phæodaria, as well as numerous Nassellaria, not observed in the surface-nets. Many of the pelagic Foraminifera were larger and had thicker shells than those taken near the surface, and many of them were dead. STATION 263.

Station 264 (Sounding 406), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19). STATION 264.

August 23, 1875; lat. 14° 19′ N., long. 152° 37′ W.

Temperature of air at noon, 79°·8; mean for the day, 77°·7.

Temperature of water:—

Surface,	77·5	180 fathoms,	48·5
10 fathoms,	77·5	190 „	48·0
20 „	77·4	200 „	47·6
30 „	77·2	300 „	44·5
40 „	76·8	400 „	42·4
50 „	73·9	500 „	40·6
60 „	67·7	600 „	39·5
70 „	63·0	700 „	38·7
80 „	59·1	800 „	38·0
90 „	56·0	900 „	37·4
100 „	54·1	1000 „	36·9
110 „	53·0	1100 „	36·6
120 „	52·0	1200 „	36·3
130 „	51·3	1300 „	35·9
140 „	50·5	1400 „	35·5
150 „	49·8	1500 „	35·2
160 „	49·3	Bottom,	35·2
170 „	48·9		

Density at 60° F.:—

Surface,	1·02572	300 fathoms.	1·02558
25 fathoms,	1·02556	400 „	1·02561
50 „	1·02550	800 „	1·02564
100 „	1·02536	2550 „	1·02536
200 „	1·02561	Bottom,	1·02594

STATION 264. Depth, 3000 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.10 A.M. shortened and furled sails. Got up steam. At 5 A.M. put trawl over, with two tow-nets attached and a tow-net at the weights, and veered 3000 fathoms. At 6.30 A.M. brought ship to wind, and at 7 A.M. sounded in 3000 fathoms. Veered trawl-rope to 3700 fathoms. Obtained serial temperatures down to 1500 fathoms. At 1 P.M. commenced heaving in trawl, which came up much torn at 4.30 P.M., but containing a few manganese nodules and specimens. At 6 P.M. made all plain sail. A few gannets were seen.

Venus Point, Tahiti, distant at noon, 1920 miles. Made good 84 miles. Amount of current 33 miles, direction S. 58° W.

ANIMALS FROM TRAWL. The following species is recorded from the trawl at this Station :—

MONAXONIDA (Ridley and Dendy, Zool. pt. 59).

Cladorhiza longipinna, n.sp. One specimen; obtained at no other locality.

In addition, the Station-Book records a fragment of *Euplectella* and a large specimen of *Stephanoscyphus* attached to manganese nodule.

ORGANISMS FROM SURFACE NETS. **Surface Organisms.**—The following species are recorded from the surface in the vicinity of this Station :—

RADIOLARIA (Haeckel, Zool. pt. 40).

Acanthosphæra capillaris, Haeckel.
Diplosphæra triglochin, Haeckel.
Icosaspis cruciata, Haeckel.
Eucoronis cervicornis, Haeckel.
Protympanium primordiale, Haeckel.
Tripocyrtis plectaniscus, Haeckel.
Carpocanium irregulare, Haeckel.
Sethoconus trochus, Haeckel.
„ *pileus*, Haeckel.
Theopilium tricostatum, Haeckel.
Thecocampe cryptoprora, Haeckel.
Cannobelos calymmata, Haeckel.
Sagoscena debilis, Haeckel.
Sagmidium tricorne, Haeckel.
Gazelletta robusta, Haeckel.
Castanidium willemoesi, Haeckel.

AMPHIPODA (Stebbing, Zool. pt. 67).

Paratyphis pacificus, n.sp.

SCHIZOPODA (Sars, Zool. pt. 37).

Thysanopoda tricuspidata, M.-Edwards, (young).

PTEROPODA (Pelseneer, Zool. pt. 65).

Limacina inflata (d'Orbigny).
„ *lesueuri* (d'Orbigny).
„ *trochiformis* (d'Orbigny).
Peraclis reticulata (d'Orbigny).
Clio (*Creseis*) *virgula* (Rang).
„ (*Hyalocylix*) *striata* (Rang).

TUNICATA (Herdman, Zool. pt. 76).

Salpa hexagona, Quoy and Gaimard.

In addition, the following are recorded in the note-books:—*Globigerina*, young Ctenophoræ, *Tomopteris*, *Evadne*, *Copilia*, *Corycæus*, *Saphirina*, Nauplii and Zoëæ of *Euphausia*, *Sergestes* and larvæ and *Elaphocaris*, larvæ of *Ianthina* (?) with large velum, Cephalopod (*Cranchia* ?). The tow-nets at the trawl and weights brought up many Phæodaria and other Radiolaria and a small Sternoptychid fish, and also specimens of *Sagitta* much larger than those taken at the surface. These deep nets also contained many dead *Globigerinæ*, *Orbulinæ*, *Pulvinulinæ*, and other pelagic Foraminifera; many of these had a dull white colour, and had holes which seemed to indicate that the shells were being dissolved. The nets also contained many dead specimens of Nassellaria and Spumellaria. If the dead shells of the Globigerinidæ came from the bottom, then a number must reach the bottom before being entirely dissolved, but there is a good deal of evidence in the deep hauls to show that they were caught by the nets while falling to the bottom. STATION 264.

Station 265 (Sounding 407), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19). STATION 265.

August 25, 1875; lat. 12° 42′ N., long. 152° 1′ W.
Temperature of air at noon, 80°·3; mean for the day, 78°·7.
Temperature of water:—

Surface,			79·2	180 fathoms,			49·1
10	fathoms,		78·6	190	„		48·8
20	„		77·8	200	„		48·5
30	„		75·8	300	„		45·4
40	„		72·6	400	„		43·3
50	„		69·2	500	„		41·5
60	„		65·6	600	„		40·1
70	„		62·0	700	„		39·0
80	„		58·3	800	„		38·1
90	„		55·2	900	„		37·4
100	„		53·3	1000	„		37·0
110	„		52·3	1100	„		36·6
120	„		51·7	1200	„		36·3
130	„		51·1	1300	„		36·0
140	„		50·6	1400	„		35·7
150	„		50·1	1500	„		35·4
160	„		49·8	Bottom,			35·0
170	„		49·5				

Density at 60° F. at surface, 1·02564; 2425 fathoms, 1·02550; bottom, 1·02551.
Depth, 2900 fathoms; deposit, Radiolarian Ooze, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

STATION 265.

At 4.30 A.M. shortened and furled sails, and got up steam to sound and dredge. At 5.30 A.M. stopped and sounded in 2900 fathoms. At 7 A.M. put dredge over and veered 3600 fathoms. Obtained serial temperatures down to 1500 fathoms. At 1 P.M. commenced heaving in dredge, which came up at 4.30 P.M. filled with a fine tenacious ooze and with one mutilated fish. Made all plain sail. A gannet and a prion-like bird were seen.

Venus Point, Tahiti, distant at noon, 1820 miles. Made good 27 miles. Amount of current for the last two days 37 miles, direction S. 71° W.

ANIMAL FROM DREDGE.

The following species is recorded from the dredge at this Station :—

FISHES (Günther, Zool. pt. 57).

Gonostoma microdon, n.sp. One specimen ; for distribution see Station 23.

ORGANISMS FROM THE DEPOSIT.

The following species of Foraminifera, Radiolaria, and Diatoms were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

FORAMINIFERA (Brady, Zool. pt. 22).—The two pelagic species are marked thus ×.

Miliolina labiosa (d'Orbigny).
Hyperammina ramosa, Brady.
„ *ragans*, Brady.
Reophax nodulosa, Brady.
Haplophragmium latidorsatum (Bornemann).
Ammodiscus gordialis (Jones and Parker).
× *Globigerina bulloides*, d'Orbigny.
× „ *pachyderma* (Ehrenberg).

RADIOLARIA (Haeckel, Zool. pt. 40).

Cenosphæra hexagonalis, Haeckel.
„ *vesparia*, Haeckel.
„ *proserpinæ*, Haeckel.
„ *compacta*, Haeckel.
Ethmosphæra pachysiphonia, Haeckel.
Cromyosphæra quadruplex, Haeckel.
Solenosphæra mesalactis, Haeckel.
Xanthosphæra hippacea, Haeckel.
Xiphosphæra helix, Haeckel.
Xiphostylus picus, Haeckel.
Amphistylus clio, Haeckel.
Stylosphæridium amphipyramis, Haeckel.
Spongodiscus laxa, Haeckel
Staurosphæra pauli, Haeckel
„ *andreæ*, Haeckel
Staurodiscus lucretii, Haeckel.
Staurosphæridium quadrispinum, Haeckel.
Hexastylus contortus, Haeckel.
Hexastylosphæra heterozonium, Haeckel.
Hexastylidium fasciatum, Haeckel.
Hexadiscus axiphæna, Haeckel.
Acanthosphæra enneacantha, Haeckel.
Conosphæra plagioconus, Haeckel.
Cladococcus quadricuspis, Haeckel.
Haliomma duodecinum, Haeckel.
„ *compactum*, Haeckel.
„ *clavatum*, Haeckel.
Actinomma hirsutum, Haeckel.
Caryomma irregulare, Haeckel.
Cenellipsis oblonga, Haeckel.
Druppatractus ostracion, Haeckel.
„ *coronatus*, Haeckel.
Pipetta salpinx, Haeckel.
Pipettaria tubaria, Haeckel.
Spongoprunum amphilonche, Haeckel.
Spongoliva prunulina, Haeckel.
Spongoxiphus sphærococcus, Haeckel.
„ *prunococcus*, Haeckel.
Stylodiscus endostylus, Haeckel.
Phacodiscus lentiformis, Haeckel.
Sethostylus distyliscus, Haeckel.
Distriactis liriantha, Haeckel.

Heliodiscus polymorphus, Haeckel.
„ *marginatus*, Haeckel.
Astrophacus asteriscus, Haeckel.
Stylocyclia amphacantha, Haeckel.
Amphicyclia chronometra, Haeckel.
Coccocyclia liriantha, Haeckel.
Diplactura diplobrachia, Haeckel.
Trigonactura triacantha, Haeckel.
Astractura hippocratis, Haeckel.
Stauractura tetragona, Haeckel.
Pentactura astropecten, Haeckel.
Echinactura goniaster, Haeckel.
Archidiscus trioniscus, Haeckel.
„ *polythalamus*, Haeckel.
Axodiscus spinosus, Haeckel.
Perichlamydium saturnus, Haeckel.
Ommatodiscus fragilis, Stöhr.
Xiphodictyon amphirrhopalia, Haeckel.
Tripodictya trigonaria, Haeckel.
Staurodictya cruciata, Haeckel.
„ *grandis*, Haeckel.
Stylodictya centrospira, Haeckel.
Stauralastrum ordo, Haeckel.
„ *rhopalophorum*, Haeckel.
Stephanastrum capitatum, Haeckel.
Discozonium cyclonium, Haeckel.
Spongodiscus biconcavus, Haeckel.
Spongasteriscus mucronatus, Haeckel.
Larnacilla medullaris, Haeckel.
Larnacantha dodecantha, Haeckel.
Tholostaurus cruciformis, Haeckel.
Tholoma metallasson, Haeckel.
Larcospira lentelliptica, Haeckel.
Archicircus princeps, Haeckel.
„ *quadratus*, Haeckel.
„ *primordialis*, Haeckel.
Lithocircus hexablastus, Haeckel.
Zygocircus sagittalis, Haeckel.
„ *dodecanthus*, Haeckel.
Cortina cervina, Haeckel.
Semantis biforis, Haeckel.
Semantrum tetrastoma, Haeckel.
Semantidium hexastoma, Haeckel.
Clathrocircus multiforis, Haeckel.
Acanthodesmia ceratospyris, Haeckel.
Eucoronis perspicillum Haeckel.
Plectocoronis triacantha, Haeckel.
Podocoronis toxarium, Haeckel.
Trissocyclus stauroporus, Haeckel.
Acrocubus arcuatus, Haeckel.

Toxarium circospyris, Haeckel. Station 265.
„ *thorax*, Haeckel.
Tympaniscus tripodiscus, Haeckel.
Tripospyris hexomma, Haeckel.
Triceraspyris cortiniscus, Haeckel.
Tristylospyris ramosa, Haeckel.
Dipospyris forcipata, Haeckel.
Dorcadospyris decussata, Haeckel.
Gamospyris circulus, Haeckel.
Stephanospyris cordata, Haeckel.
Tetraspyris cubica, Haeckel.
Hexaspyris alterna, Haeckel.
Liriospyris hexapoda, Haeckel.
Aegospyris æquispina, Haeckel.
Petalospyris bellidiastrum, Haeckel.
Anthospyris tragopogon, Haeckel.
Dictyospyris distoma, Haeckel.
Sepalospyris platyphylla, Haeckel.
Tiarospyris galea, Haeckel.
Perispyris spongiosa, Haeckel.
Botryopera cyrtoloba, Haeckel.
Cannobotrys tricanna, Haeckel.
„ *cortina*, Haeckel.
Acrobotrys disolenia, Haeckel.
Archipilium cyrtopterum, Haeckel.
Tripilidium lychnocanium, Haeckel.
„ *cladopodium*, Haeckel.
Tripodiscium tristylospyris, Haeckel.
Pteroscenium arcadophorum, Haeckel.
Bathropyramis trapezoides, Haeckel.
Halicalyptra ampulla, Haeckel.
Calpophæna petalospyris, Haeckel.
Cyrtocalpis lithomitra, Haeckel.
Halicapsa papillata, Haeckel.
Archicapsa quadriforis, Haeckel.
Dictyophimus plectaniscus, Haeckel.
Lithomelissa ehrenbergii, Bütschli.
„ *pycnoptera*, Haeckel.
Psilomelissa calvata, Haeckel.
Clathromitra pterophormis, Haeckel.
Lychnocanium lanterna, Haeckel.
„ *ventricosum*, Ehrenberg.
„ *tripodium*, Ehrenberg.
Tetrahedrina pyriformis, Haeckel.
Sethochytris pyramis, Haeckel.
Sethophormis aurelia, Haeckel.
Sethamphora costata, Haeckel.
Sethopyramis enneactis, Haeckel.
Plectopyramis hexapleura, Haeckel.
Anthocyrtis butomus, Haeckel.

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Anthocyrtium adonis, Haeckel.
,, *hispidum*, Haeckel.
,, *turris*, Haeckel.
,, *floseulus*, Haeckel.
Clistophæna rustiana, Haeckel.
Sethocyrtis oxycephalis, Haeckel.
,, *diomedis*, Haeckel.
Sethocorys patrocli, Haeckel.
Lophophæna circumtexta, Haeckel.
Dictyocephalus amphora, Haeckel.
Sethocapsa pyriformis, Haeckel.
,, *ampulla*, Haeckel.
Cryptocapsa lacca, Haeckel.
Pterocorys tubulosa, Haeckel.
Dictyoceras insectum, Haeckel.
Pterocanium orcinum, Haeckel.
Pterocodon ornatus, Haeckel.
Podocyrtis tripodiscus, Haeckel.
,, *urceolata*, Haeckel.
,, *pedicellaria*, Haeckel.
,, *scaphopodia*, Haeckel.
Thyrsocyrtis trifida, Haeckel.
Theopera fusiformis, Haeckel.
,, *chytropus*, Haeckel.
Rhopalocanium lasanum, Haeckel.
Rhopalatractus foveolatus, Haeckel.
Lithochytris pyramidalis, Ehrenberg.
Phormocyrtis embolum, Haeckel.
Alacorys octacantha, Haeckel.
,, *circinus*, Haeckel.
Cyclalophora gutheana, Haeckel.
,, *pantheon*, Haeckel.
,, *fenestrata*, Haeckel.
Calocyclas aspasia, Haeckel.
Clathrocyclas principessa, Haeckel.
,, *domina*, Haeckel.
Lamprocyclas deflorata, Haeckel.
Lophoconus rhinoceros, Haeckel.
Theocyrtis microtheca, Haeckel.
Tricolocampe cylindrica, Haeckel.
Theocorys ovata, Haeckel.
,, *obliqua*, Haeckel.
Theocampe sphærothorax, Haeckel.
Theocapsa plinii, Haeckel.
,, *darwinii*, Haeckel.
Pteropilium pyramis, Haeckel.
Stichocampe divergens, Haeckel.
Stichophormis lucerna, Haeckel.
Phormocampe metalis, Haeckel.
Cyrtophormis cornuta, Haeckel.
Artophæna ærostatica, Haeckel.
Stichophæna darwiniana, Haeckel.
Lithostrobus cornutus, Haeckel.
,, *botryocyrtis*, Haeckel.
Stichocorys panderi, Haeckel.
Lithomitra nodosaria, Haeckel.
,, *eruca*, Haeckel.
Eucyrtidium spinosum, Haeckel.
,, *profundissimum*, Ehrenberg.
,, *conostoma*, Haeckel.
Stichocapsa subglobosa, Haeckel.
Artocapsa fusiformis, Haeckel.
Aulospathis furcata, Haeckel.
Orona maxima, Haeckel.
Oroscena mülleri, Haeckel.
Oroplegma diplosphæra, Haeckel.
Challengeria quadridens, Haeckel.

DIATOMACEÆ.—The following species were observed by Mr. Comber.

Nitzschia marina, Grunow.
Asterolampra marylandica, Ehrenberg.
,, *affinis*, Greville.
,, *vulgaris*, Greville.
,, *decora*, Greville.
Asteromphalus roperianus, Ralfs.
,, *elegans*, Greville.
,, *hiltonianus*, Ralfs.
Coscinodiscus convexus, Castracane. } Probably all forms of *C. pulchellus*.
,, *curvatulus*, Castracane. }
,, *parvula*, Castracane. }
,, *pulchellus*, Greville. }
Coscinodiscus elegans, Greville (?).
,, *leptopus*, Janisch.
Coscinodiscus minor, Ehrenberg.
,, *excentricus*, Ehrenberg, and vars.
,, *marginatus*, Ehrenberg.
,, *radiatus*, Ehrenberg.
,, *borealis*, Bailey.
,, *convexus*, A. Schmidt.
,, *concinnus*, Smith.
,, *concavus*, Ehrenberg.
,, *excavatus*, Greville, var. *quadriocellata*, Grunow.
,, *nodulifer*, Janisch.
,, *asteromphalus*, Ehrenberg.
,, *africanus*, Janisch.
,, ,, var. *wallichiana*, Grunow.

Coscinodiscus obscurus, A. Schmidt.
„ *rudis*, Castracane.
„ *obovatus*, Castracane.
„ sp. (?).
Ethmodiscus sp. (?).
Hemidiscus cuneiformis, Wallich.
Hemiaulus australis, Ehrenberg (= *Eucampia balaustion*, Castracane).
„ *polycystinorum*, Ehrenberg.

Station 265.

This deposit contains many species common to the well-known fossil deposit from Barbados.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Sphærozoum hamatum, Haeckel.
Cenosphæra vesparia, Haeckel.
Siphonosphæra tubulosa, Müller.
Staurolonchidium artioscelides, Haeckel.
Acanthosphæra capillaris, Haeckel.
Diplosphæra hexagonalis, Haeckel.
Arachnosphæra dolichacantha, Haeckel.
Rhizoplegma spirale, Haeckel.
Spongellipsis lævis, Haeckel.
Theodiscus divinus, Haeckel.
Heliodrymus furcatus, Haeckel.
Monozonium pleurostylum, Haeckel.
Actinelius primordialis, Haeckel.
Acanthometron bulbiferum, Haeckel.
Zygacantha costata, Haeckel.
Phatnacantha tessaraspis, Haeckel.
Zygostaurus caudatus, Haeckel.
Amphilonche conica, Haeckel.
Orophaspis gladiata, Haeckel.
Icosaspis cruciata, Haeckel.
Dictyaspis favosa, Haeckel.
Plagonium trigeminum, Haeckel.
Protympanium primordiale, Haeckel.
Hexaspyris hexacorethra, Haeckel.
Arachnocalpis sphæroides, Haeckel.
Cornutella hexagona, Haeckel.
Carpocanium irregulare, Haeckel.
Sethoconus trochus, Haeckel.
„ *pileus*, Haeckel.
Theopilium tricostatum, Haeckel.
Theocampe cryptoprora, Haeckel.
Cannobelos calymmata, Haeckel.
Sagoscena debilis, Haeckel.
Sagmidium tricorne, Haeckel.
Auloscena gigantea, Haeckel.
Gazelletta robusta, Haeckel.
Castanidium willemoesi, Haeckel.

Siphonophoræ (Haeckel, Zool. pt. 77).

Velella patella, Brandt.
Diphyopsis angustata (Eschscholtz).

Fishes (Günther, Zool. pt. 78).

Scopelus coccoi (Cocco).

The tow-nets brought in the usual things, as noted at the last two Stations, as well as many *Hastigerinæ*. Several sharks and dolphins were seen, and a shark was caught having attached *Echeneis*, *Caligus*, and a *Distomum*.

Station 266 (Sounding 408), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19).

Station 266.

August 26, 1875 ; lat. 11° 7′ N., long. 152° 3′ W.
Temperature of air at noon, 81°·5 ; mean for the day, 79°·5.

Station 266.

Temperature of water :—

	°		°
Surface,	80·0	180 fathoms,	49·0
10 fathoms,	79·5	190 „	48·6
20 „	78·0	200 „	48·2
30 „	75·3	300 „	44·6
40 „	70·3	400 „	42·0
50 „	64·9	500 „	40·2
60 „	58·6	600 „	38·9
70 „	56·2	700 „	37·9
80 „	54·3	800 „	37·3
90 „	53·0	900 „	36·9
100 „	52·2	1000 „	36·5
110 „	51·6	1100 „	36·2
120 „	51·3	1200 „	35·9
130 „	51·0	1300 „	35·6
140 „	50·6	1400 „	35·3
150 „	50·2	1500 „	35·1
160 „	49·8	Bottom,	35·1
170 „	49·4		

Density at 60° F. :—

Surface,	1·02582	300 fathoms,	1·02566
25 fathoms,	1·02575	400 „	1·02572
50 „	1·02550	2275 „	1·02555
100 „	1·02577	Bottom,	1·02579
200 „	1·02577		

Depth, 2750 fathoms; deposit, Radiolarian Ooze, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 1.15 P.M. shortened and furled sails, and proceeded under steam. At 2 P.M. sounded in 2750 fathoms. Obtained serial temperatures down to 1500 fathoms. At 5.15 P.M. completed temperatures, and at 5.30 P.M. made all plain sail. Several petrels were seen.

Distance at noon from Venus Point, Tahiti, 1730 miles. Made good 91 miles. Amount of current 19 miles, direction S. 62° W.

Organisms from the Deposit.

Radiolaria (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station :—

Cenosphæra hexagonalis, Haeckel.
„ *elysia*, Haeckel.
Carposphæra sedilumma, Haeckel.
Lithosphæra rhodosoccus, Haeckel.
Thecosphæra floribunda, Haeckel.
Rhodosphæra hexagonia, Haeckel.
Chiamacosphæra flammeolunda, Haeckel.
Mazosphæra lagotis, Haeckel.
Caminosphæra dendrophora, Haeckel.
Solenosphæra pandora, Haeckel.
„ *megalactis*, Haeckel.
Xanthiosphæra lappacea, Haeckel.
Xiphosphæra hebe, Haeckel.
„ *vesta*, Haeckel.

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Staurosphæra thaddæi, Haeckel.
Stylostaurus caudatus, Haeckel.
Stauroxiphos gladius, Haeckel.
Stauracontium setosum, Haeckel.
Hexastylus solonis, Haeckel.
Hexalonche phænaxonia, Haeckel.
,, *curvicornis*, Haeckel.
,, *cristata*, Haeckel.
Hexancistra tricuspis, Haeckel.
Hexacontium floridum, Haeckel.
Hexacontarium dentatum, Haeckel.
Hexadoras octahedrum, Haeckel.
Acanthosphæra tenuis, Haeckel.
Haliomma compactum, Haeckel.
Cromyomma circumtextum, Haeckel.
Axellipsis perforata, Haeckel.
Ellipsostylus psittacus, Haeckel.
Lithapium pyriforme, Haeckel.
Druppula caryota, Haeckel.
Prunulum fragulum, Haeckel.
Lithatractus lobatus, Haeckel.
,, *jugatus*, Haeckel.
Druppatractus testudo, Haeckel.
,, *coronatus*, Haeckel.
Stylatractus neptunus, Haeckel.
Pipetta salpinx, Haeckel.
Spongoxiphus prunococcus, Haeckel.
Artiscus facetus, Haeckel.
Stylartus bicuspis, Haeckel.
Cyphanta circopora, Haeckel.
Cyphonium profundum, Haeckel.
Cannartidium mastophorum, Haeckel.
Ommatocampe amphilonche, Haeckel.
Zygocampe pupula, Haeckel.
Trochodiscus cenophacus, Haeckel.
Phacodiscus clypeus, Haeckel.
Perizona pterygota, Haeckel.
Sethostaurus orthostaurus, Haeckel.
Phacostaurus oceanidum, Haeckel.
Heliosestrum quadrigeminum, Haeckel.
,, *octogonium*, Haeckel.
Astrosestrum nauphanta, Haeckel.
Heliodiscus trigonodon, Haeckel.
,, *polymorphus*, Haeckel.
,, *marginatus*, Haeckel.
Amphicyclia chronometra, Haeckel.
Hymenactura copernici, Haeckel.
Astractura democriti, Haeckel.
Stauractura octogona, Haeckel.
Echinactura culcita, Haeckel.

Archidiscus dithalamus, Haeckel.
,, *pyloniscus*, Haeckel.
,, *polythalamus*, Haeckel.
Axoliscus stylophorus, Haeckel.
,, *spinosus*, Haeckel.
Porodiscus deformis, Haeckel.
Perichlamydium accrescens, Haeckel.
Staurodictya grandis, Haeckel.
Stylodictya centrospira, Haeckel.
,, *setigera*, Ehrenberg.
Amphirrhopalum echinatum, Haeckel.
Stauralastrum antiquum, Haeckel.
Pentinastrum asteriscus, Haeckel.
Hexalastrum orchidaceum, Haeckel.
Hexapyle circularis, Haeckel.
Cenolarcus minimus, Haeckel.
Larnacilla subglobosa, Haeckel.
Larnacalpis subsphærica, Haeckel.
Trizonium hexagonium, Haeckel.
Tetrapylonium armatum, Haeckel.
Staurotholus cruciatus, Haeckel.
Streblonia polymorphina, Haeckel.
Streblopyle helicina, Haeckel.
Sorenna subglobosum, Haeckel.
Sorolarcus larnacillifer, Haeckel.
Tetraplecta quadricornis, Haeckel.
Polyplecta enneacantha, Haeckel.
Archicircus princeps, Haeckel.
,, *primordialis*, Haeckel.
Lithocircus hexablastus, Haeckel.
Zygocircus sagittalis, Haeckel.
,, *dodecanthus*, Haeckel.
,, *acacia*, Haeckel.
Cortina dendroides, Haeckel.
Stephanium quadrupes, Haeckel.
Semantis biforis, Haeckel.
Semantrum tetrastoma, Haeckel.
Clathrocircus multiforis, Haeckel.
Stephaniscus quadrifurcus, Haeckel.
Semantiscus hexapodius, Haeckel.
Zygostephanus serratus, Haeckel.
Eucoronis perspicillum, Haeckel.
Podocoronis dipodiscus, Haeckel.
Acrocubus cortina, Haeckel.
Toxarium circospyris, Haeckel.
Paratympanum hexastylum, Haeckel.
Pseudocubus obeliscus, Haeckel.
Entympanium musicantum, Haeckel.
Tripospyris cortiniscus, Haeckel.
,, *capitata*, Haeckel.

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Dipyspyris irregularis, Haeckel.
,, *forcipata*, Haeckel.
Dorcadospyris lunulata, Haeckel.
,, *decussata*, Haeckel.
Stephanospyris verticillata, Haeckel.
Hexaspyris alterna, Haeckel.
Lirospyris hexapoda, Haeckel.
,, *amphithecta*, Haeckel.
Aspidospyris aquispina, Haeckel.
Pentaspyris pentacantha, Haeckel.
Elaphospyris alcicornis, Haeckel.
Petalospyris floscula, Haeckel.
Anthospyris trapezon, Haeckel.
Dictyospyris distoma, Haeckel.
Thalospyris fenestrata, Haeckel.
Lamprospyris lyellii, Haeckel.
Amphispyris quadriyemina, Haeckel.
Nephrospyris phaseolus, Haeckel.
Botryopera cyrtoloba, Haeckel.
Camnobotrys cortina, Haeckel.
Acrobotrys disolenia, Haeckel.
,, *trisolenia*, Haeckel.
Phormobotrys trithalamia, Haeckel.
Archipilium sigmopterum, Haeckel.
Euscenium tricolpium, Haeckel.
Cladoscenium fuleratum, Haeckel.
Archiscenium clathrocorys, Haeckel.
Pteroscenium tripocolpum, Haeckel.
Perulium spinipes, Haeckel.
,, *cornutum*, Haeckel.
Cyrtophormis arostatica, Haeckel.
Archiphormis urceolata, Haeckel.
Halicalyptra petalospyris, Haeckel.
Archicorys orata, Haeckel.
Archicapsa quadriforis, Haeckel.
Dictyophimus pyramis, Haeckel.
Sethophimus orthopus, Haeckel.
Lithocalicium lutschii, Haeckel.
Pelecalicus calvata, Haeckel.
Lychnocanium lanterna, Haeckel.
,, *favosum*, Haeckel.
,, *ventricosum*, Ehrenberg.
,, *tripodium*, Ehrenberg.
Lychnolecium wyvillei, Haeckel.
Micromelissa lamina, Haeckel.
Sethopyramis pentalactis, Haeckel.
,, *arachnium*, Haeckel.
,, *aurelia*, Haeckel.
Sethopyramis hexapleura, Haeckel
,, *costata*, Haeckel
Sethopyramis enneactis, Haeckel.
Plectopyramis trapezomma, Haeckel.
Anthocyrtis lauranthus, Haeckel.
Anthocyrtium adonis, Haeckel.
,, *leptostylum*, Haeckel.
,, *flosculus*, Haeckel.
Clistophæna armata, Haeckel.
Sethocyrtis oxycephalis, Haeckel.
,, *diomedis*, Haeckel.
Sethocorys patrocli, Haeckel.
Lithophæna circumtexta, Haeckel.
Dictyocephalus amphora, Haeckel.
,, *cavea*, Haeckel.
Sethocapsa pyriformis, Haeckel.
Dictyoceras insectum, Haeckel.
Pterocanium orcinum, Haeckel.
,, *pyramis*, Haeckel.
Podocyrtis tripodiscus, Haeckel.
,, *centriscus*, Ehrenberg.
,, *costata*, Haeckel.
,, *pedicellaria*, Haeckel.
,, *scaphopodia*, Haeckel.
,, *sphærogaster*, Haeckel.
Thyrsocyrtis rhizopodium, Haeckel.
Dictyopodium scaphopodium, Haeckel.
Lithornithium trochilus, Haeckel.
Theopera fusiformis, Haeckel.
,, *chytropus*, Haeckel.
Rhopalocanium lasanum, Haeckel.
Rhopalatractus fenestratus, Haeckel.
Lithochytris cortina, Haeckel.
,, *pyramidalis*, Ehrenberg.
Phormocyrtis embolum, Haeckel.
Alacorys hexacantha, Haeckel.
,, *carcinus*, Haeckel.
Cycladophora gætheana, Haeckel.
,, *pantheon*, Haeckel.
Catocyclas pudica, Haeckel.
Clathrocyclas domina, Haeckel.
Hexalatractus fusiformis, Haeckel.
Theoconus laterna, Haeckel.
Theocyrtis cylindrica, Haeckel.
,, *microtheca*, Haeckel.
Theosyringium siphonium, Haeckel.
Tricolocampe cylindrica, Haeckel.
,, *polyzona*, Haeckel.
,, *arcta*, Haeckel.
Theocorys orata, Haeckel.
,, *sphærophila*, Haeckel.
Lophocorys astrocephala, Haeckel.

Theocampe sphærothorax, Haeckel.
Theocapsa plinii, Haeckel.
„ *malpighii*, Haeckel.
„ *darwinii*, Haeckel.
Stichopera ovata, Haeckel.
Cyrtopera thoracoptera, Haeckel.
Cystophormis armata, Haeckel.
Stichophæna gœtheana, Haeckel.
Lithostrobus cornutus, Haeckel.
Dictyomitra eurythorax, Haeckel.
Lithomitra nodosaria, Haeckel.
„ *eruca*, Haeckel.
„ *chrysalis*, Haeckel.
Eucyrtidium hexagonatum, Haeckel.
Eucyrtidium teuscheri, Haeckel.
„ *ovatum*, Haeckel.
Eusyringium macrosiphon, Haeckel.
Lithocampe multiseriata, Haeckel.
„ *heptacola*, Haeckel.
Stichocapsa hexacola, Haeckel.
Artocapsa spinosa, Haeckel.
Cannopilus cyrtoides, Haeckel.
Aulospathis furcata, Haeckel.
Sagenoscena cruciata, Haeckel.
Aulosphæra sceptrophora, Haeckel.
Challengeria quadridens, Haeckel.
Cœlodoras hexagraphis, Haeckel.

Station 266.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Organisms from Surface-Nets.

Radiolaria (Haeckel, Zool. pt. 40).

Actissa larcoides, Haeckel.
Thalassoxanthium triactinium, Haeckel.
Cenosphæra primordialis, Haeckel.
Plegmosphæra leptodictyon, Haeckel.
Collosphæra pyriformis, Haeckel (?).
„ *polyedra*, Haeckel.
Siphonosphæra macrosiphonia, Haeckel.
Hexastylidium spirale, Haeckel.
Hexaloncha xenophanis, Haeckel.
Hexacontium axophænum, Haeckel.
„ *papillosum*, Haeckel.
Acanthosphæra capillaris, Haeckel.
Heliosphæra polygonaria, Haeckel.
Cladococcus pinetum, Haeckel.
Haliomma arachnium, Haeckel.
„ *spinulosum*, Müller.
„ *wyvillei*, Haeckel.
Heliosoma radians, Haeckel.
Elatomma pinetum, Haeckel.
Diplosphæra hexagonalis, Haeckel.
Astrosphæra sideræa, Haeckel.
Actinomma capillaceum, Haeckel.
„ *arcadophorum*, Haeckel.
Arachnopila polygonella, Haeckel.
Arachnopegma verticillatum, Haeckel.
Arachnosphæra dolichacantha, Haeckel.
Octodendron cubocentron, Haeckel.
Cenellipsis ovulum, Haeckel.
Spongodruppa lentisca, Haeckel.
Cypassis puella, Haeckel.
Heliosestrum medusinum, Haeckel.
Stylotrochus craticulatus, Haeckel.
Larcidium hexacanthum, Haeckel.
Lithelius solaris, Haeckel.
Actinelius primordialis, Haeckel.
Litholophus pyramidalis, Haeckel.
Acanthochiasma spirale, Haeckel.
Acanthometron cylindricum, Haeckel.
„ *bulbiferum*, Haeckel.
Zygacantha costata, Haeckel.
Acanthonia denticulata, Haeckel.
„ *diplopyramis*, Haeckel.
Lithophyllium condylatum, Haeckel.
Phractacantha bipennis, Haeckel.
Xiphacantha crucifera, Haeckel.
Stauracantha bifurca, Haeckel.
Quadriloncha tetrastaura, Haeckel.
Amphiloncha conica, Haeckel.
„ *acufera*, Haeckel.
Acantholoncha amphipolaris, Haeckel.
Hystrichaspis divaricata, Haeckel.
Stauraspis furcata, Haeckel.
Echinaspis echinoides, Haeckel.
Lychnaspis wagenschieberi, Haeckel.
Icosaspis cruciata, Haeckel.
Phractopelta tessaromma, Haeckel.
Dorypelta gladiata, Haeckel.
Coleaspis coronata, Haeckel.
Diploconus hexaphyllus, Haeckel.
Tetraplagia geometrica, Haeckel.
Plectanium sphærozoum, Haeckel.
Dendrocircus arborescens, Haeckel.

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Protypanium primordiale, Haeckel.
Tetraspyris calcarata, Haeckel.
Anthospyris aculeata, Haeckel.
Arachnocalpis sphæroides, Haeckel.
Cornutella hexagona, Haeckel.
Tripocyrtis phygomiscus, Haeckel.
Lamprodiscus coscinodiscus, Ehrenberg.
Eucecryphalus halicalyptra, Haeckel.
Lithocyrta lacca, Ehrenberg.
Arachnocorys hexaptera, Haeckel.
Carpocanium irregulare, Haeckel.
Sethocomus trochus, Haeckel.
,, *pilus*, Haeckel.
,, *rayianus*, Haeckel.
Sethocomus setosus, Haeckel.
Sethocyrtis pleuracantha, Haeckel.
Pterocorys campanula, Haeckel.
Theopilium tricostatum, Haeckel.
Theophormis medusa, Haeckel.
Cannobelos calymmata, Haeckel.
Sagoscena debilis, Haeckel.
Saymidium tricorne, Haeckel.
Auloscena gigantea, Haeckel.
Gazelletta penicillata, Haeckel.
,, *robusta*, Haeckel.
Polypetta polynema, Haeckel.
Castanidium willemoesi, Haeckel.

In addition, the following are recorded in the note-books:—Oscillatoriaceæ, *Pyrocystis*, Diatoms, *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina*, *Diphyes* and other Siphonophoræ, *Sagitta*, *Alciopa*, *Tomopteris*, *Evadne*, *Copilia*, *Saphirina*, and other Copepods, Hyperids (*Cynthia*?), *Euphausia*, *Lucifer*, *Sergestes* and larvæ, *Halobates*, *Ianthina*, *Glaucus*, *Atlanta*, many varieties of Pteropods, *Appendicularia*, *Salpa*, and small fishes.

STATION 267.

Station 267 (Sounding 409), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19).

August 28, 1875; lat. 9° 28′ N., long. 150° 49′ W.
Temperature of air at noon, 82°·0; mean for the day, 79°·2.
Temperature of water:—

Surface,	80·0	180 fathoms,	48·4
10 fathoms	77·0	190 ,,	48·1
20 ,,	73·5	200 ,,	47·8
30 ,,	68·4	300 ,,	45·0
40 ,,	61·3	400 ,,	42·5
50 ,,	56·0	500 ,,	40·8
60 ,,	53·6	600 ,,	39·5
70 ,,	52·3	700 ,,	38·5
80 ,,	51·7	800 ,,	37·8
90 ,,	51·4	900 ,,	37·1
100 ,,	51·0	1000 ,,	36·6
110 ,,	50·7	1100 ,,	36·1
120 ,,	50·3	1200 ,,	35·7
130 ,,	50·0	1300 ,,	35·4
140 ,,	49·7	1400 ,,	35·2
150 ,,	49·4	1500 ,,	35·0
160 ,,	49·1	Bottom,	35·0
170 ,,	48·8		

Density at 60° F.:— STATION 267.

Surface,	1·02490	300 fathoms,	1·02562
25 fathoms,	1·02552	400 „	1·02560
50 „	1·02552	800 „	1·02570
100 „	1·02578	2275 „	1·02564
200 „	1·02567	Bottom,	1·02572

Depth, 2700 fathoms; deposit, Radiolarian Ooze, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5.20 A.M. stopped and sounded in 2700 fathoms; only a small quantity of deposit came up in the sounding-tube. Obtained serial temperatures down to 1500 fathoms, and also specimens of water. The carbonic acid was determined in bottom water, and amounted to 40·5 milligrammes per litre. At 1 P.M. lowered four tow-nets attached a short distance from each other to the dredging-rope, and veered 2000 fathoms. Sent dingey away for surface collecting and to test the transparency of the water. At 2 P.M. commenced heaving in tow-nets which came up all foul at 3.30 P.M. At 4 P.M. proceeded under steam and sail. Several boobies and gannets were seen.

Venus Point, Tahiti, distant at noon, 1620 miles. Made good 97 miles. Amount of current 19 miles, direction S. 34° E.

Surface Organisms.—The following species are recorded from the tow-nets at the surface and down to a depth of 2000 fathoms :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Rhaphidozoum pelagicum, Haeckel.
Collosphæra pyriformis, Haeckel (?).
„ *polyedra*, Haeckel.
Siphonosphæra macrosiphonia, Haeckel.
Hexalonche xenophanis, Haeckel.
Hexacontium axophænum, Haeckel.
„ *papillosum*, Haeckel.
Acanthosphæra capillaris, Haeckel.
Heliosphæra polygonaria, Haeckel.
Cladococcus pinetum, Haeckel.
Haliomma wyvillei, Haeckel.
Heliosoma radians, Haeckel.
Elatomma pinetum, Haeckel.
Diplosphæra hexagonalis, Haeckel.
Actinomma capillaceum, Haeckel.
Arachnosphæra dolichacantha, Haeckel.
Cypassis puella, Haeckel.
Stylotrochus craticulatus, Haeckel.
Larcarium octostylum, Haeckel.
Lithelius solaris, Haeckel.
Actinelius primordialis, Haeckel.
Acanthometron cylindricum, Haeckel.
„ *bulbiferum*, Haeckel.
Zygacantha costata, Haeckel.
Acanthonia denticulata, Haeckel.
„ *diplopyramis*, Haeckel.
Amphilonche conica, Haeckel.
„ *acufera*, Haeckel.
Acantholonche amphipolaris, Haeckel.
Icosaspis cruciata, Haeckel.
Belonaspis conifera, Haeckel.
Plectophora pyramidalis, Haeckel.
Dendrocircus arborescens, Haeckel.
Protympanium primordiale, Haeckel.
Anthospyris aculeata, Haeckel.
Arachnocalpis sphæroides, Haeckel.
Cornutella hexagona, Haeckel.
Eucecryphalus halicalyptra, Haeckel.

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Carpocanium irregulare, Haeckel.
Sethoconus trochus, Haeckel.
,, *pileus*, Haeckel.
,, *rayianus*, Haeckel.
,, *setosus*, Haeckel.
Pterocorys campanula, Haeckel.
Theopilium tricostatum, Haeckel.
Cannobelos calymmata, Haeckel.
Sagoscena debilis, Haeckel.
Sagmidium tricorne, Haeckel.
Auloscena gigantea, Haeckel.
Gazelletta robusta, Haeckel.
Castanidium willemoesi, Haeckel.

Macrura (Spence Bate, Zool. pt. 52).

Gennadas parvus, n.g., n.sp.,

Fishes (Günther, Zool. pt. 78).

Echeneis remora, Linné (from shark).

Although the deep tow-nets came up foul, they had evidently worked for a short time, for they contained several specimens of *Tuscaridium* and *Challengeria*. Several sharks were seen, and two were caught, having attached *Echeneis*, *Caligus*, and *Distomum*; they were accompanied by pilot-fishes. A whale and flying-fishes were also seen.

In the afternoon Mr. Buchanan and Mr. Murray made several experiments from a boat on the transpareney of sea-water; a white plate, 12 inches square, could be seen down to a depth of 25 fathoms with the aid of a water-glass.

Station 268.

Station 268 (Sounding 410), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19).

August 30, 1875, lat. 7° 35′ N., long. 149° 49′ W.
Temperature of air at noon, 78°·8; mean for the day, 77°·5.
Temperature of water :—

Surface,	81·0	180 fathoms,	48·6
10 fathoms,	79·3	190 ,,	48·4
20 ,,	79·3	200 ,,	48·2
30 ,,	79·3	300 ,,	45·8
40 ,,	78·2	400 ,,	43·2
50 ,,	74·0	500 ,,	41·1
60 ,,	63·4	600 ,,	40·0
70 ,,	56·2	700 ,,	39·2
80 ,,	52·6	800 ,,	38·7
90 ,,	51·0	900 ,,	38·2
100 ,,	50·3	1000 ,,	37·7
110 ,,	50·0	1100 ,,	37·2
120 ,,	49·8	1200 ,,	36·7
130 ,,	49·6	1300 ,,	36·3
140 ,,	49·4	1400 ,,	35·8
150 ,,	49·2	1500 ,,	35·3
160 ,,	49·0	Bottom,	34·8
170 ,,	48·8		

Density at 60° F. :— STATION 268.

Surface,	1·02570	200 fathoms,	1·02563
25 fathoms,	1·02559	300 „	1·02554
50 „	1·02575	400 „	1·02554
100 „	1·02569	Bottom,	1·02569

Depth, 2900 fathoms; deposit, Radiolarian Ooze, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.15 A.M. shortened and furled sails and got up steam. At 6.45 A.M. sounded in 2900 fathoms. This deposit presented a great similarity in physical as well as microscopical properties to the deepest sounding (Station 225). Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in bottom (?) water, and amounted to 34·3 milligrammes per litre. At 1.30 P.M. completed temperatures and made all plain sail. Gannets, boatswain birds, fulmars, and land-birds like snipe were seen.

Venus Point, Tahiti, distant at noon, 1505 miles. Made good 44 miles. Amount of current for the last two days 34 miles, direction E.

RADIOLARIA (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station :— ORGANISMS FROM THE DEPOSIT.

Cenosphæra hexagonalis, Haeckel.
„ *crassa*, Haeckel.
„ *gigantea*, Haeckel.
Ethmosphæra conosiphonia, Haeckel.
Sethosphæra entosolenia, Haeckel.
Carposphæra melissa, Haeckel.
„ *melitomma*, Haeckel.
Thecosphæra entactinia, Haeckel.
Rhodosphæra pentaphylla, Haeckel.
Cromyosphæra scorodonium, Haeckel.
Caryosphæra hexalepas, Haeckel.
Chœnicosphæra flammabunda, Haeckel.
Siphonosphæra marginata, Haeckel.
Trypanosphæra trepanata, Haeckel.
Solenosphæra pandora, Haeckel.
„ *megalactis*, Haeckel.
Otosphæra auriculata, Haeckel.
Coronosphæra diadema, Haeckel.
Clathrosphæra arachnoides, Haeckel.
Xanthiosphæra lappacea, Haeckel.
Xiphosphæra hebe, Haeckel.
Xiphostylus gallus, Haeckel.
Stylosphæra calliope, Haeckel.
Spongostylus gladiatus, Haeckel.
Staurosphæra christiana, Haeckel.
Staurolonche brunonis, Haeckel.
„ *moleschottii*, Haeckel.
Stauracontium cruciferum, Haeckel.
Cromyostaurus verticillatus, Haeckel.
Hexastylus maximus, Haeckel.
„ *brevispinus*, Haeckel.
Hexalonche phænaxonia, Haeckel.
„ *conicornis*, Haeckel.
„ *grandis*, Haeckel.
„ *cristata*, Haeckel.
Hexacontium triplosphærium, Haeckel.
Cubosphæra concentrica, Haeckel.
Acanthosphæra tenuis, Haeckel.
„ *brevispina*, Haeckel.
„ *conifera*, Haeckel.
Heliosphæra floribunda, Haeckel.
„ *solaris*, Haeckel.
Cladococcus tricladus, Haeckel.
Haliomma compactum, Haeckel.
Actinomma pachycapsa, Haeckel.
Caryomma regulare, Haeckel.
Ellipsidium artocarpus, Haeckel.
Ellipsoxiphus atractus, Haeckel.
Ellipsostylus hirundo, Haeckel.
Lithapium monocyrtis, Haeckel.
Druppula pandanus, Haeckel.
„ *caryota*, Haeckel.
Druppocarpus borassus, Haeckel.
Prunulum crenatum, Haeckel.

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Prunocarpus melocactus, Haeckel.
Lithatractus convallaria, Haeckel.
„ *carluetis*, Haeckel.
„ *lobatus*, Haeckel.
„ *jugatus*, Haeckel.
Druppatractus coronatus, Haeckel.
„ *xiphias*, Haeckel.
Stylatractus neptunus, Haeckel.
Cromyatractus cepicius, Haeckel.
Pipetta fusus, Haeckel.
„ *salpinx*, Haeckel.
Spongurus phalanga, Haeckel.
Spongatractus fusiformis, Haeckel.
Spongoxiphus prunococcus, Haeckel.
Cannartus violina, Haeckel.
Cyphonium hexagonium, Haeckel.
„ *profundum*, Haeckel.
Cyrtasis entomocora, Haeckel.
Cannartiscus amphicylindrus, Haeckel.
Cannartidium mammiferum, Haeckel.
Panarium facettarium, Haeckel.
Peripanarium conocylindricum, Haeckel.
Ommatocampe polyarthra, Ehrenberg.
Desmocampe tanioides, Haeckel.
Crucidiscus cuspidatus, Haeckel.
Trichodiscus stellaris, Haeckel.
Periphæna cincta, Haeckel.
Perizona scutella, Haeckel.
Sethostylus dicylindrus, Haeckel.
Tructiscus tricuspis, Haeckel.
Sethastaurus coronatus, Haeckel.
Heliastrum octangulum, Haeckel.
Astrastrum nauphanta, Haeckel.
Heliodiscus trigonodon, Haeckel.
„ *polymorphus*, Haeckel.
„ *marginatus*, Haeckel.
Lithocyclia lenticula, Haeckel.
Stylocyclia pricacantha, Haeckel.
Amphicyclia chromonetra, Haeckel.
Astrocyclia blaster, Haeckel.
Coscinoscyclia heliantha, Haeckel.
Diplostaura diplocomus, Haeckel.
Tripostaura tripodiscus, Haeckel.
Hexastaurum pleuroni, Haeckel.
Staurastrum radiatum, Haeckel.
Echinastrum asterinum, Haeckel.
Archidiscus octonarius, Haeckel.
„ *polythalamius*, Haeckel.
Cenodiscus spinosus, Haeckel.
Porodiscus hexagonalis, Haeckel.
Porodiscus deformis, Haeckel.
Staurodictya grandis, Haeckel.
Stylodictya centrospira, Haeckel.
Stylocladamydium spongiosum, Haeckel.
Hymeniastrum trigonarium, Haeckel.
Stauralastrum clavigerum, Haeckel.
Histiastrum gladiatum, Haeckel.
„ *circulare*, Haeckel.
Stephanastrum quadratum, Haeckel.
Hexalastrum crinanthum, Haeckel.
Triodiscus lenticula, Haeckel.
Pylodiscus nephropylus, Haeckel.
Spongodiscus radiatus, Haeckel.
Spongoloncha conostyla, Haeckel.
Amphipyle stauroceros, Haeckel.
Tetrapyle circopyle, Haeckel.
Pylospira tetrapyle, Haeckel.
Streblonia bulimina, Haeckel.
Plagiacantha elatine, Haeckel.
Archicircus princeps, Haeckel.
„ *primordialis*, Haeckel.
„ *triglyphus*, Haeckel.
Lithocircus hexablastus, Haeckel.
Zygocircus sagittalis, Haeckel.
„ *pentagonus*, Haeckel.
„ *dodecanthus*, Haeckel.
Cortina conifera, Haeckel.
„ *dendroides*, Haeckel.
Semantis biforis, Haeckel.
Semantrum tetrastoma, Haeckel.
Clathrocircus multiforis, Haeckel.
Cortiniscus dipylaris, Haeckel.
Zygostephanium dizonium, Haeckel.
Encoromis perspicillum, Haeckel.
Trissocircus binellipsis, Haeckel.
„ *globus*, Haeckel.
Protympanium trissocircus, Haeckel.
Acrocubus amphistylus, Haeckel.
Toxarium circospyris, Haeckel.
Tympaniscus dipodiscus, Haeckel.
Paratympanum octostylum, Haeckel.
Circotympanum hexagonium, Haeckel.
Eutympanium octonarium, Haeckel.
Tristylospyris tripodiscium, Haeckel.
Dipospyris chelifer, Haeckel.
„ *irregularis*, Haeckel.
„ *forcipata*, Haeckel.
Dorcadospyris dentata, Haeckel.
„ *decussata*, Haeckel.
„ *dinoceras*, Haeckel.

Gamospyris annulus, Haeckel.
Stephanospyris excellens, Haeckel.
Hexaspyris alterna, Haeckel.
Liriospyris hexapoda, Haeckel.
Cantharospyris carabus, Haeckel.
Aegospyris æquispina, Haeckel.
Pentaspyris isacantha, Haeckel.
Therospyris felis, Haeckel.
Petalospyris tessaromma, Haeckel.
Anthospyris tragopogon, Haeckel.
Dictyospyris distoma, Haeckel.
Sepalospyris polyphylla, Haeckel.
Botryopera cyrtoloba, Haeckel.
Cannobotrys cortina, Haeckel.
Acrobotrys disolenia, Haeckel.
Trissopilium tetraplecta, Haeckel.
Tripilidium clavatum, Haeckel.
Pteroscenium spinulosum, Haeckel.
Peridium papillatum, Haeckel.
Cystophormis pila, Haeckel.
Halicalyptra petalospyris, Haeckel.
Archiphæna corona, Haeckel.
Cornutella mitra, Ehrenberg.
Archicorys ampulla, Haeckel.
Cyrtocalpis compacta, Haeckel.
Archicapsa quadriforis, Haeckel.
Sethopilium cyrtopus, Haeckel.
Lithomelissa bütschlii, Haeckel.
,, *corythium*, Ehrenberg.
Psilomelissa calvata, Haeckel.
Clathromitra pentacantha, Haeckel.
Lychnocanium lanterna, Haeckel.
,, *ventricosum*, Ehrenberg.
,, *tripodium*, Ehrenberg.
Lychnodictyum wyvillei, Haeckel.
Sethochytris triconiscus, Haeckel.
Sethophormis aurelia, Haeckel.
Sethamphora costata, Haeckel.
Sethopyramis hexalactis, Haeckel.
,, *enneactis*, Haeckel.
Anthocyrtis lauranthus, Haeckel.
Anthocyrtium adonis, Haeckel.
,, *leptostylum*, Haeckel.
,, *flosculus*, Haeckel.
Sethophæna hexaptera, Haeckel.
Sethocyrtis oxycephalis, Haeckel.
,, *diomedis*, Haeckel.
Sethocorys patrocli, Haeckel.
Lophophæna circumtexta, Haeckel.
Dictyocephalus amphora, Haeckel.
Dictyocephalus urceolus, Haeckel. Station 268.
Sethocapsa pyriformis, Haeckel.
,, *bulla*, Haeckel.
Dictyoceras insectum, Haeckel.
Pterocanium orcinum, Haeckel.
Podocyrtis tripodiscus, Haeckel.
,, *flosculata*, Haeckel.
,, *costata*, Haeckel.
,, *pedicellaria*, Haeckel.
,, *scaphopodia*, Haeckel.
,, *triacantha*, Haeckel.
Thyrsocyrtis arborescens, Haeckel.
Dictyopodium thyrsolophus, Haeckel.
Lithornithium falco, Haeckel.
Theopera fusiformis, Haeckel.
,, *chytropus*, Haeckel.
Rhopalocanium lasanum, Haeckel.
,, *delphicum*, Haeckel.
Rhopalatractus pentacanthus, Haeckel.
Lithochytris pyramidalis, Haeckel.
,, *pteropus*, Haeckel.
Phormocyrtis embolum, Haeckel.
,, *longicornis*, Haeckel.
Alacorys enneacantha, Haeckel.
,, *carcinus*, Haeckel.
Cycladophora gœtheana, Haeckel.
,, *spinosa*, Haeckel.
,, *pantheon*, Haeckel.
Clathrocyclas collaris, Haeckel.
,, *domina*, Haeckel.
Theocyrtis microtheca, Haeckel.
Theosyringium pipetta, Haeckel.
Lophocyrtis holothuria, Haeckel.
Tricolocampe cylindrica, Haeckel.
,, *polyzona*, Haeckel.
,, *cingulata*, Haeckel.
,, *arcta*, Haeckel.
Theocorys ovata, Haeckel.
,, *attenuata*, Haeckel.
,, *minervæ*, Haeckel.
Theocampe sphærothorax, Haeckel.
Theocapsa plinii, Haeckel.
,, *darwinii*, Haeckel.
Podocampe tripodiscus, Haeckel.
Cyrtophormis fimbriata, Haeckel.
Lithostrobus distichus, Haeckel.
,, *cornutus*, Haeckel.
,, *lithobotrys*, Haeckel.
Stichocorys mülleri, Haeckel.
Lithomitra nodosaria, Haeckel.

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Lithomitra cruca, Haeckel.
Eucyrtidium hexagonatum, Haeckel.
„ *teuscheri*, Haeckel.
Eucyrtidium conosiphon, Haeckel.
Cyrtocapsa pyrum, Haeckel.
Stichocapsa tricincta, Haeckel.
„ *compacta*, Haeckel.
Aulospathis furcata, Haeckel.
Orona robusta, Haeckel.
Oroscena gegenbauri, Haeckel.
Oroplegma spinulosum, Haeckel.
Challengeria quadridens, Haeckel.
Castanissa macleani, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Carposphæra borassus, Haeckel.
Thecosphæra favosa, Haeckel.
Collosphæra pyriformis, Haeckel (?).
„ *polyedra*, Haeckel.
Siphonosphæra tubulosa, Haeckel.
„ *macrosiphonia*, Haeckel.
Amphisphæra pluto, Haeckel.
Hexalonche xenophanis, Haeckel.
Hexacontium axophænum, Haeckel.
„ *papillosum*, Haeckel.
Acanthosphæra capillaris, Haeckel.
Heliosphæra polygonaria, Haeckel.
Cladococcus pinetum, Haeckel.
Haliomma datura, Haeckel.
„ *wyrillei*, Haeckel.
„ *permagnum*, Haeckel.
Heliosoma radians, Haeckel.
Elatomma pinetum, Haeckel.
Diplosphæra hexagonalis, Haeckel.
Actinomma capillaceum, Haeckel.
Arachnosphæra dolichacantha, Haeckel.
Cyphasis puella, Haeckel.
Stylotrichus craticulatus, Haeckel.
Lithelius solaris, Haeckel.
Actinelius primordialis, Haeckel.
Acanthometron cylindricum, Haeckel.
„ *bulbiferum*, Haeckel.
Zygacantha costata, Haeckel.
Acanthonia denticulata, Haeckel.
Acauthonia diplopyramis, Haeckel.
Amphilonche conica, Haeckel.
„ *acufera*, Haeckel.
Acantholonche amphipolaris, Haeckel.
Stauraspis cruciata, Haeckel.
Icosaspis cruciata, Haeckel.
„ *icosastaura*, Haeckel.
Thoracaspis nephropora, Haeckel.
Phatnaspis lacunaria, Haeckel.
Dendrocircus arborescens, Haeckel.
Protympanium primordiale, Haeckel.
Tetraspyris scoparia, Haeckel.
Anthospyris aculeata, Haeckel.
Arachnocalpis sphæroides, Haeckel.
Cornutella hexagona, Haeckel.
Eucecryphalus halicalyptra, Haeckel.
Carpocanium irregulare, Haeckel.
Sethocoms troclus, Haeckel.
„ *pileus*, Haeckel.
„ *rayianus*, Haeckel.
„ *setosus*, Haeckel.
Pterocorys campanula, Haeckel.
Theopilium tricostatum, Haeckel.
Cannobelos calymmata, Haeckel.
Sagosceua debilis, Haeckel.
Sagmidium tricorne, Haeckel.
Aulosceua gigantea, Haeckel.
Gazelletta robusta, Haeckel.
Castanidium willemoesi, Haeckel.

Copepoda (Brady, Zool. pt. 23).

Eucalanus attenuatus (Dana).
Undina darwinii, Lubbock.
Scolecithrix danæ (Lubbock).
Euchæta prestandreæ, Philippi.
Oithona sp. (?).
Oncæa obtusa (Dana).

Amphipoda (Stebbing, Zool. pt. 67).

Phronimella elongata, Claus.

Schizopoda (Sars, Zool. pt. 37).

Thysanopoda tricuspidata, M.-Edwards, (young).

In addition, the following are recorded in the note-books :—Diatoms, *Pyrocystis*, *Peridinium*, *Globigerina*, *Hastigerina*, *Pullenia*, *Sphæroidina*, *Pulvinulina*, *Diphyes*, Echinoderm larvæ, *Sagitta*, Annelid larvæ, *Evadne*, *Copilia*, *Corycæus*, *Saphirina*, *Oxycephalus*, Hyperids, *Euphausia*, *Lucifer* and larvæ, *Sergestes*, *Amphion*, *Halobates*, small Lamellibranchs and Gasteropods, *Atlanta* and other Heteropods, *Hyalæa* [= *Cavolinia*], *Spirialis* [= *Limacina*], *Styliola*, *Tiedemannia* [= *Gleba*], Pteropod larvæ, *Appendicularia*, *Salpa*. Several sharks were seen. The *Pulvinulinæ* and *Pulleniæ* were to-day covered with a yellow-coloured sarcode, so as to completely cover and obscure the shell; in this sarcode were entangled small Diatoms, Coccospheres, Rhabdospheres, Infusoria, and small Crustacea. Masses of yellow sarcode, quite similar to that surrounding these Foraminifera, were frequently observed in the tow-net gatherings, and had most probably been separated from the *Pulvinulinæ* and *Pulleniæ* by the dragging of the net and washing of its contents into collecting bottles. STATION 268.

On August 31 and September 1 the fauna was found to be similar, the ship being on these two days in the counter equatorial current, which carried her 120 miles to the east.

Station 269 (Sounding 411), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19). STATION 269.

September 2, 1875 ; lat. 5° 54′ N., long. 147° 2′ W.
Temperature of air at noon, 81°·0 ; mean for the day, 79°·5.
Temperature of water :—

Surface,	81·2	180 fathoms,	49·0
10 fathoms,	80·4	190 „	48·8
20 „	78·0	200 „	48·5
30 „	77·8	300 „	46·0
40 „	77·8	400 „	43·7
50 „	77·8	500 „	41·4
60 „	77·6	600 „	39·9
70 „	77·0	700 „	38·6
80 „	73·1	800 „	37·5
90 „	66·0	900 „	36·7
100 „	59·5	1000 „	36·0
110 „	55·4	1100 „	35·5
120 „	52·5	1200 „	35·3
130 „	51·1	1300 „	35·2
140 „	50·3	1400 „	35·2
150 „	49·7	1500 „	35·2
160 „	49·4	Bottom,	35·2
170 „	49 2		

Station 269.

Density at 60° F.:—

Surface,	1·02591	200 fathoms,	1·02560
25 fathoms,	1·02577	400 „	1·02568
50 „	1·02583	800 „	1·02593
100 „	1·02565	Bottom,	1·02571

Depth, 2550 fathoms; deposit, Radiolarian Ooze, containing 20 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5.30 A.M. stopped to sound and dredge. At 6 A.M. sounded in 2550 fathoms. The high percentage of carbonate of lime at this depth is remarkable, and has only been met with in tropical waters; it is apparently connected with the large number of calcareous organisms in the counter equatorial current. At 7 A.M. put over dredge with tow-net attached and tow-net at the weights, and veered 3000 fathoms. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in bottom water, and amounted to 32·8 milligrammes per litre. At 4 P.M. commenced heaving in dredge. At 7 P.M. dredge came up foul, but the tow-nets contained a little mud and a small fish and some red Crustaceans. Made sail. Boatswain birds, fulmars, gannets, shearwaters, and land birds, like dotterels, were seen.

Distance at noon from Venus Point, Tahiti, 1410 miles. Made good 85 miles. Amount of current 24 miles, direction S. 75° E.

Organisms from the Deposit.

The following species of Foraminifera, Radiolaria, and Diatoms were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 85 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
Haplophragmium latidorsatum (Bornemann).
Thurammina papillata, Brady.
Cornuspira polygyra, d'Orbigny.
Virgulina subsquamosa, Egger.
Cassidulina subglobosa, Brady.
Lagena formosa, Schwager.
„ *globosa* (Montagu).
„ *gracilis*, Williamson.
„ *laevigata* (Reuss).
„ *lagenoides* (Williamson), var. *tenuistriata*, Brady
Nodosaria sp. (?).
× *Globigerina dubia*, Egger.
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny
× *Pullenia obliquiloculata*, Parker and Jones.
„ *quinqueloba*, Reuss.
„ *sphæroides* (d'Orbigny).
Sphæroidina bulloides, d'Orbigny (?).
× „ *dehiscens*, Parker and Jones.
Truncatulina lobatula (Walker and Jacob).
„ *pygmæa*, Hantken.
„ *tenera*, Brady.
„ *wuellerstorfi* (Schwager).
Pulvinulina exigua, Brady.
„ *farus*, Brady.
× „ *menardii* (d'Orbigny).
× „ *tumida*, Brady.
Rotalia soldanii, d'Orbigny.
Nonionina pompilioides (Fichtel and Moll)
„ *umbilicatula* (Montagu).

RADIOLARIA (Haeckel, Zool. pt. 40). STATION 269.

Cenosphæra hexagonalis, Haeckel.
Carposphæra melitomma, Haeckel.
Chœnicosphæra flammabunda, Haeckel.
Solenosphæra pandora, Haeckel.
„ *megalactis*, Haeckel.
Otosphæra auriculata, Haeckel.
Coronosphæra diadema, Haeckel.
Xanthiosphæra lappacea, Haeckel.
Hexalonche phænaxonia, Haeckel.
„ *cristata*, Haeckel.
Acanthosphæra tenuis, Haeckel.
Haliomma compactum, Haeckel.
Lithatractus carduelis, Haeckel.
„ *lobatus*, Haeckel.
„ *jugatus*, Haeckel.
Cyphonium profundum, Haeckel.
Heliodiscus trigonodon, Haeckel.
Archidiscus polythalamus, Haeckel.
Axodiscus spinosus, Haeckel.
Stylodictya centrospira, Haeckel.
Archicircus princeps, Haeckel.
„ *primordialis*, Haeckel.
Cortina dendroides, Haeckel.
Clathrocircus multiforis, Haeckel.
Toxarium circospyris, Haeckel.
Dorcadospyris dentata, Haeckel.
Aegospyris æquispina, Haeckel.
Botryopera cyrtoloba, Haeckel.
Cannobotrys cortina, Haeckel.
Acrobotrys disolenia, Haeckel.
Lithomelissa bütschlii, Haeckel.
Psilomelissa calvata, Haeckel.
Lychnodictyum wyvillei, Haeckel.
Sethophormis aurelia, Haeckel.
Sethamphora costata, Haeckel.
Anthocyrtis lauranthus, Haeckel.
Anthocyrtium leptostylum, Haeckel.
„ *flosculus*, Haeckel.
Sethocyrtis oxycephalis, Haeckel.
Sethocorys patrocli, Haeckel.
Dictyocephalus amphora, Haeckel.
Sethocapsa pyriformis, Haeckel.
Cryptocapsa pila, Haeckel.
Dictyoceras insectum, Haeckel.
Pterocanium orcinum, Haeckel.
Podocyrtis tripodiscus, Haeckel.
„ *costata*, Haeckel.
„ *scaphopodia*, Haeckel.
Theopera fusiformis, Haeckel.
Cycladophora gœtheana, Haeckel.
„ *pantheon*, Haeckel.
Theocyrtis microtheca, Haeckel.
Tricolocampe cylindrica, Haeckel.
„ *polyzona*, Haeckel.
„ *arcta*, Haeckel.
Theocampe sphærothorax, Haeckel.
Theocapsa darwinii, Haeckel.
Lithomitra nodosaria, Haeckel.
Eucyrtidium hexagonatum, Haeckel.
„ *teuscheri*, Haeckel.

DIATOMACEÆ.—The following species were observed by Mr. Comber and Mr. Rattray.

Navicula distans, Ralfs.
„ *prætexta*, Ehrenberg.
„ *aspera*, Ehrenberg.
„ *pandura*, Brebisson.
„ *lyra*, Ehrenberg, var. *abnormis*, Schmidt (?).
Nitzschia marina, Grunow.
„ *panduriformis*, Gregory.
Synedra doliolus, Wallich.
„ *ulna*, Ehrenberg.
„ *vitrea*, Kutzing, forma *angustior tenuirostris*, Grunow.
Actinocyclus ellipticus, Grunow (= *Cestodiscus ovalis*, Greville).
„ *denticulatus*, Castracane.
Actinocyclus elongatus, Grunow (= *Coscinodiscus humilis*, Rattray, = *Willemoesia*, Castracane).
„ *oliveranus*, O'Meara.
„ *ehrenbergii*, Ralfs.
„ sp. (?).
Asterolampra marylandica, Ehrenberg.
Asteromphalus elegans, Greville.
„ *hiltonianus*, Ralfs.
„ *brookei*, Bailey.
„ *shadboltianus*, Ralfs.
„ *humboldtii*, Ehrenberg.
Actinoptychus undulatus, Ehrenberg.
Campylodiscus limbatus, Brebisson.

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Auliscus affinis, Grunow.
Cestodiscus gemmifer, Castracane, and var.
,, *trochus*, Castracane.
,, *parmula*, Castracane.
,, *coronatus*, Castracane.
,, *fasciculatus*, Castracane.
,, *pulchellus*, Greville.
Coscinodiscus patellæformis, Greville.
,, *elegans*, Greville.
,, *angusto-lineatus*, A. Schmidt.
,, *leptopus*, Janisch.
,, *excentricus*, Ehrenberg.
,, ,, var. *punctifera*, Grunow.
,, *subtilis*, Ehrenberg.
,, *rothii*, Grunow.
,, *marginatus*, Grunow.
,, *fimbriatus*, Ehrenberg.
,, *radiatus*, Ehrenberg.
,, ,, var. *media*, Grunow.
,, *argus*, Ehrenberg.
,, *crassus*, Bailey, var.
,, *centralis*, Ehrenberg.
,, *convexus*, A. Schmidt.
,, *nodulifer*, Janisch.
,, *decrescens*, Grunow.
,, *africanus*, Janisch.
,, *rudis*, Castracane.
,, *excavatus*, Greville.
,, ,, var. *biocellata*, Grunow.
,, *concavus*, Ehrenberg.
,, *rex*, Wallich.
Coscinodiscus curvatulus, Grunow, var. *genuina*, Grunow.
,, *curvatulus*, var. *recta*, Rattray.
,, *lineatus*, Ehrenberg.
,, *gigas*, Ehrenberg.
,, *griseus*, Greville.
,, *concinnus*, W. Smith, var. *jonesiana*, Rattray.
,, *robustus*, Greville.
,, *oculus-iridis*, Ehrenberg.
,, *naviculoides*, Truan and Witt.
,, *radiosus*, Grunow.
,, *lentiginosus*, Janisch.
,, *tumidus*, Janisch.
,, sp. (?).
Ethmodiscus sp. (?).
Craspedodiscus groveanus (= *Coscinodiscus*, Rattray)
,, *coscinodiscus*, Ehrenberg.
Roperia tessellata, Grunow.
Hemidiscus cuneiformis, Wallich.
,, ,, var. *angusta*, Janisch (?)
Hemiaulus antarcticus, Ehrenberg.
Rhizosolenia styliformis, Brightwell.
Surirella fastuosa, Ehrenberg.
Podosira montagnei, Kutzing.
Biddulphia pulchella, Gray.
Achnanthes brevipes, Agardh.
,, *subsessilis*, Ehrenberg.
Triceratium favus, Ehrenberg.
,, *antediluvianum*, Van Heurck

Organisms from Surface Nets.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Collosphæra pyriformis, Haeckel (?).
,, *polyedra*, Haeckel.
Siphonosphæra macrosiphonia, Haeckel.
Hexalonche xenophanis, Haeckel.
Hexacontium axophænum, Haeckel.
,, *papillosum*, Haeckel.
Acanthosphæra capillaris, Haeckel.
Heliosphæra polygonaria, Haeckel.
Clathrocyclus punctum, Haeckel.
Haliommia datura, Haeckel.
,, *cyrillai*, Haeckel.
Heliosoma rubians, Haeckel.
Elatomma punctum, Haeckel
Diplophæra hexagonalis, Haeckel.
Actinomma capillaceum, Haeckel.
Arachnosphæra dolichacantha, Haeckel.
Cypassis puella, Haeckel.
Lithelius solaris, Haeckel.
Actinelius primordialis, Haeckel.
Acanthometron cylindricum, Haeckel
,, *bulbiferum*, Haeckel.
Zygacantha costata, Haeckel.
Acanthonia denticulata, Haeckel.
,, *diplopyramis*, Haeckel.
Amphilonche conica, Haeckel.
,, *acufera*, Haeckel.
Acantholonche amphipolaris, Haeckel.
Tessaraspis pentagonalis, Haeckel.

Icosaspis cruciata, Haeckel.
Dendrocircus arborescens, Haeckel.
Protympanium primordiale, Haeckel.
Anthospyris aculeata, Haeckel.
Arachnocalpis sphæroides, Haeckel.
Cornutella hexagona, Haeckel.
Tripocyrtis tripodiscus, Haeckel.
Eucecryphalus halicalyptra, Haeckel.
Carpocanium irregulare, Haeckel.
Sethoconus trochus, Haeckel.
Sethoconus pileus, Haeckel. STATION 269.
,, *rayianus*, Haeckel.
,, *setosus*, Haeckel.
Pterocorys campanula, Haeckel.
Theopilium tricostatum, Haeckel.
Cannobelos calymmata, Haeckel.
Sagoscena debilis, Haeckel.
Gazelletta robusta, Haeckel.
Castanidium willemoesi, Haeckel.

SIPHONOPHORÆ (Haeckel, Zool. pt. 77).
Cuneolaria incisa, Eysenhardt (?).

COPEPODA (Brady, Zool. pt. 23).
Saphirina metallina, Dana.

CIRRIPEDIA (Hoek, Zool. pt. 25).
Lepas hilli (Leach). (From screw).
Chthalamus challengeri, n.sp. (From screw).

AMPHIPODA (Stebbing, Zool. pt. 67).
Paraphronima cuivis, n.sp.

MACRURA (Spence Bate, Zool. pt. 52).
Mastigopus crassus (Suhm, MS.), n.sp.

PTEROPODA (Pelseneer, Zool. pt. 65).
Cavolinia longirostris (Lesueur).

CEPHALOPODA (Hoyle, Zool. pt. 44).
Chiroteuthis (?) sp. (From stomach of shark).

FISHES (Günther, Zool. pt. 78).
Diplophos pacificus, n.sp., (young).

In addition, the following are recorded in the note-books:—*Pyrocystis* (two forms), *Peridinium*, Diatoms, *Globigerina*, *Pullenia*, *Pulvinulina*, Echinoderm larvæ, *Sagitta*, Annelid larvæ, Zoëæ, various Pteropods, *Doliolum*, *Appendicularia*, and fish eggs. Sharks and flying fishes were seen, and several sharks were caught, having fish remains, parts of a large cuttle-fish, pieces of pork, rope, &c., in their stomachs; one of them had several specimens of *Echinorhynchus* in the intestine. The screw was taken up, after having been down for a long time, and on it were found small Balanids, a few specimens of *Lepas*, *Caprella*, and small polyps.

Station 270 (Sounding 412), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19). STATION 270.

September 4, 1875; lat. 2° 34′ N., long. 149° 9′ W.
Temperature of air at noon, 81°·5; mean for the day, 78°·7.

Station 270.

Temperature of water :—

Surface,	79·5	180 fathoms,	52·6
10 fathoms,	78·7	190 „	52·3
20 „	77·7	200 „	52·0
30 „	77·0	300 „	48·3
40 „	76·2	400 „	45·0
50 „	75·5	500 „	42·7
60 „	75·3	600 „	40·6
70 „	75·3	700 „	39·5
80 „	72·8	800 „	38·7
90 „	67·3	900 „	38·0
100 „	62·8	1000 „	37·7
110 „	59·1	1100 „	37·3
120 „	56·5	1200 „	37·0
130 „	55·0	1300 „	36·7
140 „	54·2	1400 „	36·3
150 „	53·5	1500 „	36·0
160 „	53·2	Bottom,	34·6
170 „	52·9		

Density at 60° F. :—

Surface,	1·02621	300 fathoms,	1·02575
25 fathoms,	1·02591	400 „	1·02572
50 „	1·02572	2500 „	1·02575
100 „	1·02567	Bottom,	1·02578
200 „	1·02572		

Depth, 2925 fathoms; deposit, Globigerina Ooze, containing 71·47 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.15 A.M shortened and furled sails. At 5.30 A.M proceeded under steam. At 6 A.M. sounded in 2925 fathoms. There were about six inches of ooze in the tube, the lower part pure white and gradually becoming brown on the upper surface. The white lower layer was nearly pure Globigerina Ooze, while the upper brown layer seemed to be composed of equal parts of siliceous and calcareous organisms. Took serial temperatures down to 1500 fathoms. At 8.30 A.M. temperature line fouled the screw. Stopped and lowered whaler to inspect the line; raised screw and cleared the line. At noon completed observations and made all plain sail.

Venus Point, Tahiti, distant at noon, 1203 miles. Made good 104 miles. Amount of current 55 miles, direction S. 76° W.

The following species of Deep-Sea Keratosa and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :—

Deep-Sea Keratosa (Haeckel, Zool. pt. 82).

Station 270. Organisms from the Deposit.

Ammolynthus haliphysema, n.g., n.sp. Obtained at no other locality.
Stannarium concretum, n.g., n.sp. Obtained at no other locality.

Radiolaria (Haeckel, Zool. pt. 40).

Cenosphæra hexagonalis, Haeckel.
Carposphæra melitomma, Haeckel.
Rhodosphæra melitomma, Haeckel.
Chœnicosphæra flammabunda, Haeckel.
Solenosphæra variabilis, Haeckel.
,, *pandora*, Haeckel.
,, *megalactis*, Haeckel.
Otosphæra auriculata, Haeckel.
Coronosphæra diadema, Haeckel.
Clathrosphæra lamellosa, Haeckel.
Xanthiosphæra erinacea, Haeckel.
,, *lappacea*, Haeckel.
Sphærostylus hippocampus, Haeckel.
Hexalonche phænaxonia, Haeckel.
,, *cristata*, Haeckel.
Hexadoras lychnosphæra, Haeckel.
Acanthosphæra tenuis, Haeckel.
Haliomma compactum, Haeckel.
Ellipsoxiphus elegans, Haeckel.
Lithomespilus phlogoides, Haeckel.
Lithapium halicapsa, Haeckel.
Lithatractus leptostylus, Haeckel.
,, *carduelis*, Haeckel.
,, *lobatus*, Haeckel.
,, *jugatus*, Haeckel.
Stylatractus compactus, Haeckel.
Cyphonium profundum, Haeckel.
Cyphinidium coronatum, Haeckel.
Panartus tetraplus, Haeckel.
Peripanartus amphiconus, Haeckel.
,, *cylindrus*, Haeckel.
Panicium scoparium, Haeckel.
Panarium tubularium, Haeckel.
Ommatartus amphicanna, Haeckel.
Zygartus doliolum, Haeckel.
,, *chrysalis*, Haeckel.
Heliosestrum irregulare, Haeckel.
Astrosestrum ephyra, Haeckel.
Heliodiscus trigonodon, Haeckel.
Trigonactura rhopalastrella, Haeckel.
Astractura clavigera, Haeckel.
Archidiscus polythalamus, Haeckel.
Axodiscus spinosum, Haeckel.
Stylodictya centrospira, Haeckel.
Stauralastrum horridum, Haeckel.
Stylotrochus geddesii, Haeckel.
Spongolena spongura, Haeckel.
Spongaster quadratus, Haeckel.
Dizonium amphacanthum, Haeckel.
Tholartus tricolus, Haeckel.
,, *isocolus*, Haeckel.
Archicircus princeps, Haeckel.
,, *primordialis*, Haeckel.
Cortina dendroides, Haeckel.
Clathrocircus multiforis, Haeckel.
Cortiniscus tripodiscus, Haeckel.
Stephaniscus tetrapodius, Haeckel.
Toxarium circospyris, Haeckel.
,, *furcatum*, Haeckel.
Triceraspyris tripodiscus, Haeckel.
Dorcadospyris dentata, Haeckel.
,, *antilope*, Haeckel.
Aegospyris æquispina, Haeckel.
Gorgospyris eurycolpos, Haeckel.
Dictyospyris quadriloba, Haeckel.
Lamprospyris hookeri, Haeckel.
Amphispyris thorax, Haeckel.
Nephrospyris paradoxa, Haeckel.
Botryopera cyrtoloba, Haeckel.
Cannobotrys cortina, Haeckel.
Acrobotrys disolenia, Haeckel.
Archiphormis campanulata, Haeckel.
Spongocyrtis arachnoides, Haeckel.
Lithomelissa bütschlii, Haeckel.
Psilomelissa calvata, Haeckel.
Callimitra carolotæ, Haeckel.
Lychnodictyum wyvillei, Haeckel.
Sethophormis rotula, Haeckel.
,, *aurelia*, Haeckel.
Sethamphora costata, Haeckel.
Anthocyrtis lauranthus, Haeckel.
Anthocyrtium chrysanthemum, Haeckel.
,, *leptostylum*, Haeckel.
,, *flosculus*, Haeckel.
Sethocyrtis oxycephalis, Haeckel.
Sethocorys patrocli, Haeckel.
Lophophæna liothorax, Haeckel.
Dictyocephalus amphora, Haeckel.

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Sethocapsa pyriformis, Haeckel.
,, *macroceros*, Haeckel.
Dictyoceras insectum, Haeckel.
Pterocanium orcinum, Haeckel.
Podocyrtis tripodiscus, Haeckel.
,, *costata*, Haeckel.
,, *scaphopodia*, Haeckel.
,, *lithoconus*, Haeckel.
Theopera fusiformis, Haeckel.
Cycladophora pantheon, Haeckel.
Theocyrtis microtheca, Haeckel.
Tricolocampe cylindrica, Haeckel.
,, *polyzona*, Haeckel.
,, *urnula*, Haeckel.
,, *arcta*, Haeckel.
Lophocorys boricornis, Haeckel.
Theocampe sphærothorax, Haeckel.
Theocapsa mülleri, Haeckel.
,, *darwinii*, Haeckel.
Lithostrobus hexastichus, Haeckel.
Lithostrobus seriatus, Haeckel.
Artostrobus articulatus, Haeckel.
Lithomitra nodosaria, Haeckel.
Eucyrtidium hexagonatum, Haeckel.
,, *teuscheri*, Haeckel.
,, *stöhrii*, Haeckel.
Siphocampe erucosa, Haeckel.
Spirocyrtis cornutella, Haeckel.
,, *merospira*, Haeckel.
Spirocampe collispira, Haeckel.
Stichocapsa quadrigata, Haeckel.
Mesocena stellata, Haeckel.
Dictyocha triommata, Ehrenberg.
Distephanus pentasterias, Haeckel.
,, *octonarius*, Haeckel.
Cannosphæra pacifica, Haeckel.
Challengeron monodon, Haeckel.
,, *crosbiei*, Haeckel.
Cœlodendrum serratum, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool., pt. 40).

Sphærozoum stellatum, Haeckel.
Plegmosphæra pachyplegma, Haeckel.
Collosphæra pyriformis, Haeckel (?).
,, *potyedra*, Haeckel.
Siphonosphæra macrosiphonia, Haeckel.
Saturnalis annularis, Haeckel.
Hexaloncha xenophanis, Haeckel.
Hexacontium phænaxonium, Haeckel.
,, *axophænum*, Haeckel.
,, *papillosum*, Haeckel.
Acanthosphæra insignis, Haeckel.
,, *capillaris*, Haeckel.
Heliosphæra polygonaria, Haeckel.
Cladococcus pinetum, Haeckel.
Haliomma datura, Haeckel.
,, *wyvillei*, Haeckel.
Heliosoma radians, Haeckel.
Elatomma pinetum, Haeckel.
Diplosphæra hexagonatis, Haeckel.
Actinomma hexagonium, Haeckel.
,, *capillaceum*, Haeckel.
Arachnosphæra dolichacantha, Haeckel.
Rhizosphæra serrata, Haeckel.
Druppatractus hippocampus, Haeckel.
Cypassis puella, Haeckel.
Sethodiscus phacoides, Haeckel.
Hymeniastrum euclidus, Haeckel.
Myelastrum dodecaceros, Haeckel.
Hexapyle dodecantha, Haeckel.
Pylodiscus triangularis, Haeckel.
Spongobrachium lanceolatum, Haeckel.
Larnacantha quadricornis, Haeckel.
Amphipyle octoceros, Haeckel.
Tetrapyle quadricornis, Haeckel.
,, *quadrigata*, Haeckel.
Octopyle sexangulata, Haeckel.
Pylonium quadricorne, Haeckel.
Lithelius solaris, Haeckel.
Phorticium spironium, Haeckel.
Actinelius primordialis, Haeckel.
Acanthometron cylindricum, Haeckel.
,, *bulbiferum*, Haeckel.
Zygacantha costata, Haeckel.
Acanthonia denticulata, Haeckel.
,, *diplopyramis*, Haeckel.
Astrolonche bicruciata, Haeckel.
Xiphacantha falcata, Haeckel.
Amphilonche conica, Haeckel.
,, *acufera*, Haeckel.
Acantholonche amphipolaris, Haeckel.

Dorataspis typica, Haeckel.
Ceriaspis scrobiculata, Haeckel.
Tessaraspis irregularis, Haeckel.
Lychnaspis rottenburgii, Haeckel.
Icosaspis cruciata, Haeckel.
Hexaconus ciliatus, Haeckel.
Dendrocircus arborescens, Haeckel.
Protympanium primordiale, Haeckel.
Tetraspyris tetracorethra, Haeckel.
Anthospyris aculeata, Haeckel.
Arachnocalpis sphæroides, Haeckel.
Cornutella hexagona, Haeckel.
Cornutanna orthoconus, Haeckel.
Dictyophimus hertwigii, Haeckel.
Eucecryphalus halicalyptra, Haeckel.
Arachnocorys araneosa, Haeckel.
Carpocanium irregulare, Haeckel.
Sethoconus trochus, Haeckel.
„ *pileus*, Haeckel.
Sethoconus rayianus, Haeckel.
„ *setosus*, Haeckel.
Pterocorys campanula, Haeckel.
„ *rhinoceros*, Haeckel.
Theopilium tricostatum, Haeckel.
Corocalyptra agnesæ, Haeckel.
Cannobelos calymmata, Haeckel.
Distephanus mesophthalmus, Haeckel.
Sagena pertusa, Haeckel.
Sagoscena debilis, Haeckel.
Aularia ternaria, Haeckel.
Gazelletta macronema, Haeckel.
„ *orthonema*, Haeckel.
„ *robusta*, Haeckel.
Castanella campbelli, Haeckel.
Castanidium willemoesi, Haeckel.
„ *aldrichi*, Haeckel.
Conchidium terebratula, Haeckel.

NUDIBRANCHIATA (Bergh, Zool. pt. 26).

Glaucus atlanticus, Forster (infested by *Distoma glauci*).

In addition, the following are recorded in the note-books:—Foraminifera very abundant, especially *Pullenia obliquiloculata*, while *Globigerina*, *Sphæroidina*, and *Pulvinulina* were also numerous; *Sagitta*, Copepods, Hyperids, larvæ of *Euphausia*, *Sergestes*, *Lucifer*, Pteropods, and *Appendicularia*. Long banks of compound Radiolaria were passed through, and several large *Salpæ* were seen. There was a good deal of phosphorescence in the wake of the ship.

The following species are recorded from the surface in the North Pacific and Central Pacific, the exact locality not being noted:—

COPEPODA (Brady, Zool. pt. 23).

Pontella securifer, n.sp.

AMPHIPODA (Stebbing, Zool. pt. 67).

Synopia schéeleana, Bovallius.
Phronimella elongata, Claus.
Brachyscelus acuticaudatus, n.sp.

STOMATOPODA (Brooks, Zool. pt. 45).

Alima gracilis, M.-Edwards (= larva of *Squilla*).

SCHIZOPODA (Sars, Zool. pt. 37).

Nematoscelis rostrata, n.g., n.sp.
Siriella thompsoni (M.-Edwards).
„ *gracilis*, Dana.

MACRURA (Spence Bate, Zool. pt. 52).

Sergestes edwardsii, Krøyer.
„ *præcollus*, n.sp.
„ *spiniventralis*, n.sp.
„ *utrinquedens*, n.sp.
Sciacaris sp. (?).
Lucifer typus, Thompson.
Caricyphus gibberosus, n.g., n.sp.

Station 271. **Station 271** (Sounding 413), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19).

September 6, 1875 ; lat. 0° 33′ S., long. 151° 34′ W.
Temperature of air at noon, 78°·3 ; mean for the day, 77°·3.
Temperature of water :—

	°		°
Surface,	78·7	180 fathoms,	52·2
10 fathoms,	77·0	190 ,,	51·6
20 ,,	76·2	200 ,,	51·0
30 ,,	76·2	300 ,,	46·5
40 ,,	76·2	400 ,,	42·9
50 ,,	76·2	500 ,,	40·7
60 ,,	76·2	600 ,,	39·5
70 ,,	74·5	700 ,,	38·7
80 ,,	68·8	800 ,,	38·2
90 ,,	63·2	900 ,,	37·7
100 ,,	59·4	1000 ,,	37·2
110 ,,	57·0	1100 ,,	36·7
120 ,,	56·0	1200 ,,	36·3
130 ,,	55·3	1300 ,,	36·1
140 ,,	54·7	1400 ,,	35·9
150 ,,	54·1	1500 ,,	35·7
160 ,,	53·4	Bottom,	35·0
170 ,,	52·8		

Density at 60° F. :—

Surface,	1·02661	400 fathoms,	1·02577
25 fathoms,	1·02625	800 ,,	1·02591
50 ,,	1·02638	1975 ,,	1·02594
100 ,,	1·02622	Bottom,	1·02587
200 ,,	1·02588		

Depth, 2425 fathoms ; deposit, Globigerina Ooze, containing 81·27 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. shortened and furled sails, and got up steam to sound. At 5.30 A.M. sounded in 2425 fathoms. It is to be noted that in this and the previous sounding there was a greater abundance of carbonate of lime organisms than might be expected at such great depths, and this seems to be connected with the large number of pelagic Foraminifera and Pteropods found on the surface in this locality in the equatorial and counter equatorial streams. At 7.30 A.M. put over trawl. Obtained serial temperatures down to 1500 fathoms. At 1 P.M. commenced heaving in trawl, which came up at 4 P.M. with numerous specimens. At 4.30 P.M. made all plain sail.

Venus Point, Tahiti, distant at noon, 1020 miles. Made good 94 miles. Amount of current 41 miles, direction S. 81° W.

The following species are recorded in the Zoological Reports from the trawl at this Station :— Station 271. Animals from Trawl.

Deep-Sea Keratosa (Haeckel, Zool. pt. 82).

Ammolynthus prototypus, n.g., n.sp. Obtained at no other locality.
Cerelasma gyrosphæra, n.g., n.sp. Obtained at no other locality.
Stannophyllum zonarium, n.g., n.sp. Obtained at no other locality.
,, *radiolarium*, n.g., n.sp. Obtained at no other locality.
,, *pertusum*, n.g., n.sp. Obtained at no other locality.
,, *venosum*, n.g., n.sp. Obtained at no other locality.
,, *globigerinum*, n.g., n.sp. Obtained at no other locality.
The genus *Stannophyllum* was not obtained elsewhere, and was represented by over one hundred specimens.
Stannoma dendroides, n.g., n.sp. Obtained also at Station 272, 2600 fathoms.
,, *coralloides*, n.g., n.sp. Obtained also at Station 272, 2600 fathoms. The genus *Stannoma* was obtained only at these two Stations.

Hexactinellida (Schulze, Zool. pt. 53).

Holascus ridleyi, n.g., n.sp. One specimen; obtained at no other locality. [Reported in error from Station 211].
Hyalonema gracile, n.sp. One specimen; obtained at no other locality. [Reported in error from Station 211].
,, *divergens*, n.sp. One specimen; obtained at no other locality.
,, (*Stylocalyx*) *depressum*, n.sp. Three specimens; obtained also at Station 246.
,, (,,) *elegans*, n.sp. One specimen; obtained at no other locality.
,, sp. (?). Several fragments.

Echinoidea (Agassiz, Zool. pt. 9).

Homolampas fulva, n.sp. Three specimens and fragments; obtained at no other locality.

Holothurioidea (Théel, Zool. pt. 13).

Peniagone wyvillii, n.g., n.sp. One specimen; obtained at no other locality.
Benthodytes papillifera, n.g., n.sp. Four specimens; obtained also at Stations 184 and 300.

Lamellibranchiata (Smith, Zool. pt. 35).

Arca (*Barbatia*) *corpulenta*, n.sp. Obtained also at Stations 184, 194, 198, 216a, and 300.

Station 271. Nudibranchiata (Bergh, Zool. pt. 26).

Bathydoris abyssorum, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus. The body of this specimen was gelatinous and transparent, the tentacles brown, the gills and protruding external generative organs orange, the foot dark purple.

Cephalopoda (Hoyle, Zool. pt. 44).

Enoploteuthis margaritifera, Rüppell. One specimen; obtained also at Station 195.

Brachiopoda (Davidson, Zool. pt. 1).

Discina atlantica, King. One specimen; for distribution see Station 106.

Tunicata (Herdman, Zool. pt. 17).

Culeolus moseleyi, n.g., n.sp. One specimen; obtained at no other locality.

Fishes (Günther, Zool. pts. 57 and 78).

Malacosarcus macrostoma, n.g., n.sp. One specimen; obtained also at Station 276, 2350 fathoms. Only species of the genus.

Macrurus armatus, Hector. One specimen; for distribution see Station 146.

Lepidopus tenuis, n.sp. One specimen (probably from near the surface); obtained also at Station 232.

In addition to the foregoing, the following are recorded in the Station-book:—Fragment of *Euplectella*, three specimens of *Stephanoscyphus* and Polyzoon.

Excluding Protozoa, about 140 specimens of invertebrates and fishes were obtained at this Station, belonging to about 29 species, of which 22 are new to science, including representatives of 10 new genera; 15 of the new species and 2 new genera were not obtained elsewhere.

The large number of specimens noted at this Station is due to the fact that more than a hundred examples of Deep-Sea Keratosa are included.

Organisms from the Deposit.

The following species of Foraminifera, Radiolaria, and Diatoms were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 86 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
" " var. *murrhyna*, Schwager.
Miliolina oblonga (Montagu).
" *venusta* (Karrer).
Pulvinulina cylindrica, Brady.
Storthosphæra (?) sp.
Psammosphæra fusca, Schulze.
Hyperammina elongata, Brady.
" *vagans*, Brady.
Rhizammina algæformis, Brady.

Rhizammina sp. (?).
Reophax dentaliniformis, Brady.
„ *difflugiformis*, Brady.
„ *scorpiurus*, Montfort.
Haplophragmium globigeriniforme (Parker and Jones).
„ *glomeratum*, Brady.
„ *latidorsatum* (Bornemann).
„ *turbinatum*, Brady.
Thurammina papillata, Brady.
Hormosina normani, Brady.
„ *ovicula*, Brady.
Ammodiscus charoides (Jones and Parker).
„ *gordialis* (Jones and Parker).
Trochammina galeata, Brady.
„ *pauciloculata*, Brady.
„ *trullissata*, Brady.
Textularia agglutinans, d'Orbigny (?).
Gaudryina pupoides, d'Orbigny.
Bulimina inflata, Seguenza.
Virgulina schreibersiana, Czjzek.
Cassidulina subglobosa, Brady.
Ehrenbergina hystrix, Brady.
Lagena acuta (Reuss).
„ *acuticosta*, Reuss.
„ *apiculata* (Reuss).
„ *aspera*, Reuss.
„ *fimbriata*, Brady.
„ *formosa*, Schwager.
„ „ var. *comata*, Brady.
„ *globosa* (Montagu).
„ *gracilis*, Williamson.
„ *hexagona* (Williamson).
„ *lævigata* (Reuss).
„ *lagenoides* (Williamson), var. *tenuistriata*, Brady.
„ *marginata* (Walker and Boys).
„ *orbignyana* (Seguenza).
„ *plumigera*, Brady.
Lagena semistriata, Williamson. STATION 271.
„ *sulcata* (Walker and Jacob).
„ *torquata*, Brady.
„ sp. (?).
Nodosaria communis, d'Orbigny.
„ (*Glandulina*) *lævigata*, d'Orbigny.
„ (*Dentalina*) *mucronata*, Neugeboren.
Polymorphina angusta, Egger.
„ *lanceolata*, Reuss.
„ *longicollis*, Brady.
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *cretacea*, d'Orbigny.
× „ *digitata*, Brady.
× „ *dubia*, Egger.
× „ *inflata*, d'Orbigny.
× „ *rubra*, d'Orbigny.
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Hastigerina pelagica* (d'Orbigny).
× *Pullenia obliquiloculata*, Parker and Jones.
„ *quinqueloba*, Reuss.
„ *sphæroides* (d'Orbigny).
× *Sphæroidina dehiscens*, Parker and Jones.
Truncatulina dutemplei (d'Orbigny).
„ *lobatula*, Walker and Jacob.
„ *pygmæa*, Hantken.
„ *ungeriana* (d'Orbigny).
„ *wuellerstorfi* (Schwager).
× *Pulvinulina canariensis* (d'Orbigny)
× „ *crassa* (d'Orbigny).
„ *favus*, Brady.
× „ *menardii* (d'Orbigny).
„ *partschiana* (d'Orbigny).
× „ *tumida*, Brady.
Rotalia soldanii, d'Orbigny.
Nonionina pompilioides (Fichtel and Moll).
„ *umbilicatula* (Montagu).

RADIOLARIA (Haeckel, Zool. pt. 40).—The following species were observed by Professor Haeckel and Dr. Dreyer.

I. SPUMELLARIA.

a. Sphæroidea.

Cenosphæra hexagonalis, Haeckel.
„ *inermis*, Haeckel.
„ *mellifica*, Haeckel.
Cenosphæra favosa, Haeckel.
„ *vesparia*, Haeckel.
„ *bombus*, Haeckel.
„ *setosa*, Haeckel.
„ *elysia*, Haeckel.
„ *solida*, Haeckel.
„ *reticulata*, Haeckel.

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Cenosphæra polygonalis, Haeckel.
„ *papillata*, Haeckel.
„ *antiqua*, Haeckel.
„ *marginata*, Haeckel.
Carposphæra melitomma, Haeckel.
„ *nodosa*, Haeckel.
„ *cubaxonia*, Haeckel.
„ *infundibulum*, Haeckel.
„ *nobilis*, Haeckel.
Thecosphæra phænaxonia, Haeckel.
„ *favosa*, Haeckel.
„ *inermis*, Haeckel.
„ *medusa*, Haeckel.
„ *diplococcus*, Haeckel.
Cromyosphæra rosetta, Haeckel.
„ *conifera*, Haeckel.
„ *fragilis*, Haeckel.
Caryosphæra hexalepas, Haeckel.
Plegmosphæra pachypila, Haeckel.
„ *exodictyon*, Haeckel.
Collosphæra regularis, Haeckel.
„ *polygona*, Haeckel.
„ *pyriformis*, Haeckel.
Tribonosphæra centripetalis, Haeckel.
Chænicosphæra flammabunda, Haeckel.
Acrosphæra crinacea, Haeckel.
Siphonosphæra macrosiphonia, Haeckel.
„ *serpula*, Haeckel.
Caminosphæra elongata, Haeckel.
„ *dichotoma*, Haeckel.
Solenosphæra variabilis, Haeckel.
„ *pandora*, Haeckel.
„ *megalactis*, Haeckel.
„ *cornucopia*, Haeckel.
„ *amalthea*, Haeckel.
Otosphæra polymorpha, Haeckel.
„ *auriculata*, Haeckel.
Coronosphæra calycina, Haeckel.
„ *convolvulus*, Haeckel.
Clathrosphæra lamellosa, Haeckel.
Xanthiosphæra lappacea, Haeckel.
„ *crinacea*, Haeckel.
Xiphosphæra planeta, Haeckel.
„ *gea*, Haeckel.
„ *venus*, Haeckel.
„ *vesta*, Haeckel.
Xiphostylus phasianus, Haeckel.
Saturnalis annularis, Haeckel.
Stylosphæra clio, Haeckel.
Sphærostylus hippocampus, Haeckel.
Amphisphæra neptunus, Haeckel.
„ *coronos*, Haeckel.
„ *pluto*, Haeckel.
Amphistylus hippocampus, Haeckel.
Cromyostylus gladius, Haeckel.
Spongostylus hastatus, Haeckel.
Staurosphæra cruciata, Haeckel.
„ *thomæ*, Haeckel.
Stylostaurus gladiatus, Haeckel.
Staurolonche epicurii, Haeckel.
Staurolonchidium artioscelides, Haeckel.
Staurancistra quadricuspis, Haeckel.
Staurocromyum quadruplex, Haeckel.
Hexastylus pittaci, Haeckel.
„ *hirsutus*, Haeckel.
„ *phænaxonius*, Haeckel.
„ *biantis*, Haeckel.
„ *cochleatus*, Haeckel.
Hexalonche phænaxonia, Haeckel.
„ *cristata*, Haeckel.
„ *pythagoræa*, Haeckel.
„ *grandis*, Haeckel.
„ *castanella*, Haeckel.
Hexancistra quadricuspis, Haeckel.
Hexacontium octahedrum, Haeckel.
„ *lævigatum*, Haeckel.
Hexadoridium streptacanthum, Haeckel.
Acanthosphæra tenuis, Haeckel.
„ *mucronata*, Haeckel.
„ *reticulata*, Haeckel.
„ *brevispina*, Haeckel.
„ *gibbosa*, Haeckel.
Heliosphæra hexagonaria, Haeckel.
Conosphæra orthoconus, Haeckel.
Haliomma lirianthus, Haeckel.
„ *circumtextum*, Haeckel.
„ *compactum*, Haeckel.
„ *longispinum*, Haeckel.
„ *wyvillei*, Haeckel.
Heliosoma hastatum, Haeckel.
„ *longispina*, n.sp., MS.
Diplosphæra dictyota, Haeckel.
Astrosphæra hexagonalis, Haeckel.
Actinomma denticulatum, Haeckel
„ *japonicum*, Haeckel.
„ *dodecomma*, Haeckel.
Pityomma scoparium, Haeckel.
Cromyodrymus abietinus, Haeckel.
Cromyechinus icosacanthus, Haeckel.
Rhizosphæra trigonacantha, Haeckel.

b. Prunoidea.

Cenellipsis circopora, Haeckel.
Ellipsidium opuntia, Haeckel.
Ellipsoxiphus elegans, Haeckel.
Lithomespilus phlogoides, Haeckel.
,, *phloginus*, Haeckel.
Lithapium pyriforme, Haeckel.
Druppocarpus ananassa, Haeckel.
,, *castanea*, Haeckel.
Pipettella elongata, Haeckel.
Lithatractus leptostylus, Haeckel.
,, *pachystylus*, Haeckel.
,, *carduelis*, Haeckel.
,, *lobatus*, Haeckel.
,, *jugatus*, Haeckel.
,, *conostylus*, Haeckel.
,, *gamoporus*, Haeckel.
,, *conifer*, Haeckel.
Druppatractus belone, Haeckel.
Stylatractus compactus, Haeckel.
,, *carduus*, Haeckel.
,, *papillosus*, Haeckel.
Spongodruppa terebintha, Haeckel.
Artiscus paniscus, Haeckel.
,, *paniculus*, Haeckel.
Cannartus violina, Haeckel.
Cyphonium profundorum, Haeckel.
,, *ethmarium*, Haeckel.
Cyphinus amphilophus, Haeckel.
Cyphinidium coronatum, Haeckel.
Panartus tetraplus, Haeckel.
,, *tetracolus*, Haeckel.
,, *quadrijugus*, Haeckel.
Peripanartus palliatus, Haeckel.
,, *cylindrus*, Haeckel.
Panicium scoparium, Haeckel.
,, *coronatum*, Haeckel.
Peripanicium amphicorona, Haeckel.
Panarium tubularium, Haeckel.
,, *pipettarium*, Haeckel.
Ommatocampe nereis, Haeckel.
Ommatartus amphicanna, Haeckel.
Zygartus chrysalis, Haeckel.
,, *doliolum*, Haeckel.

c. Discoidea.

Cenodiscus phacoides, Haeckel.
,, *lenticula*, Haeckel.
Crucidiscus echinatus, Haeckel.
Sethodiscus macrococcus, Haeckel.
Phacodiscus rotula, Haeckel. STATION 271.
Sethostaurus cruciatus, Haeckel.
Heliosestrum octastrum, Haeckel.
,, *irregulare*, Haeckel.
Astrosestrum ephyra, Haeckel.
,, *echinastrum*, Haeckel.
,, *pelagia*, Haeckel.
Heliodiscus trigonodon, Haeckel.
,, *asteriscus*, Haeckel.
,, *pacificus*, n.sp., MS.
,, *speciosus*, n.sp., MS.
Astrophacus asteriscus, Haeckel.
Coccodiscus darwinii, Haeckel.
Staurocyclia serrata, Haeckel.
Pentactura astropecten, Haeckel.
Trigonactura rhopalastrella, Haeckel.
Astractura clavigera, Haeckel.
Archidiscus dioniscus, Haeckel.
,, *hexoniscus*, Haeckel.
,, *polythalamus*, Haeckel.
Axodiscus hexagonus, Haeckel.
,, *spinosum*, Haeckel.
Porodiscus quadrigatus, Haeckel.
,, *orbiculatus*, Haeckel.
,, *concentricus*, Haeckel.
,, *flustrella*, Haeckel.
,, *spiralis*, Haeckel.
,, *semispiralis*, Haeckel.
Ommatodiscus circularis, Haeckel.
,, *obscurus*, n.sp., MS.
,, *ovatus*, n.sp., MS.
Stomatodiscus osculatus, Haeckel.
Stylodictya centrospira, Haeckel.
,, *gracilis*, Haeckel.
Stylochlamydium perispirale, Haeckel.
Rhopalastrum malleus, Haeckel.
,, *pacificum*, n.sp., MS.
Amphibrachium amphilonche, Haeckel.
Euchitonia stöhrii, Haeckel.
Chitonastrum triglochin, Haeckel.
Hagiastrum mohammedis, Haeckel.
Tessarastrum democriti, Haeckel.
Stephanastrum quadratum, Haeckel.
Myelastrum rotula, Haeckel.
Triolena trigonalis, Haeckel.
Triopyle circulus, Haeckel.
Hexapyle polyacantha, Haeckel.
,, *hexacantha*, Haeckel.
Discozonium hexagonium, Haeckel.
Spongophacus periphæna, Haeckel.

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Spongolonche amphistyla, Haeckel.
Spongodiscus favus, Haeckel.
„ *spiralis*, Haeckel.
Stylotrochus geddesii, Haeckel.
„ *craticulatus*, Haeckel.
Spongotrochus parma, Haeckel.
Dictyocoryne tetradiscus, Haeckel.
Spongasteriscus ovatus, Haeckel.
Spongaster tetras, Haeckel,
„ *quadratus*, Haeckel.

d. Larcoidea.

Cenolarcus primordialis, Haeckel.
Larnacilla typus, Haeckel.
„ *subglobosa*, Haeckel.
Larnacidium hexalodonium, Haeckel.
Larnacantha drymacantha, Haeckel.
Dizonium ellipticum, Haeckel.
Amphipyle acoros, Haeckel.
Tetrapyle nephropyle, Haeckel.
„ *dodecaceros*, Haeckel.
Pylonium hexazonium, Haeckel.
Amphipylonium semilunare, Haeckel.
Tetrapylonium octacanthum, Haeckel.
Amphitholus artidium, Haeckel.
Tholartus paniscus, Haeckel.
Tholocubus tesseralis, Haeckel.
Tholonium hexonium, Haeckel.
Cubotholonium ellipsoides, Haeckel.
Zonarium octangulum, Haeckel.
Zoniscus tetracanthus, Haeckel.
„ *hexatholius*, Haeckel.
Lithelius spiralis, Haeckel.
Larcospira sexangula, Haeckel.
„ *oliva*, Haeckel.
Tholospira cervicornis, Haeckel.
Spironium arbustum, Haeckel.
Streblonia rosalina, Haeckel.
Streblacantha hastigerina, Haeckel.
Spongophortis larnacilla, Haeckel.
Sorcuma acinonum, Haeckel.
„ *stosum*, Haeckel.
„ *acerrulina*, Haeckel.
Sorolarcus terminalis, Haeckel.

II. Nassellaria.

a. Plectoidea.

Triplagia primordialis, Haeckel.
Plectaniscus clathrocorys, Haeckel.

b. Stephoidea.

Archicircus princeps, Haeckel.
„ *primordialis*, Haeckel.
„ *quadratus*, Haeckel.
„ *herlwigii*, Haeckel.
„ *sexangularis*, Haeckel.
Zygocircus rhombicus, Haeckel.
Corlina dendroides, Haeckel.
Semantis biforis, Haeckel.
Semantidium hexastoma, Haeckel.
Semantrum signarium, Haeckel.
Clathrocircus stapedius, Haeckel.
„ *mulliforis*, Haeckel.
„ *decaporus*, Haeckel.
Corliniscus tripodiscus, Haeckel.
Stephaniscus tetrapodius, Haeckel.
Semantiscus hexaspyris, Haeckel.
Zygostephanus reniformis, Haeckel.
„ *dissocircus*, Haeckel.
Eucoronis nephrospyris, Haeckel.
Tricyclidium semantrum, Haeckel.
Tristephanium octopyle, Haeckel.
Trissocircus octahedrus, Haeckel.
Prolympanium amphipodium, Haeckel.
Toxarium circospyris, Haeckel.
„ *bifurcum*, Haeckel.
„ *furcatum*, Haeckel.
Microcubus dodecasloma, Haeckel.
„ *zonarius*, Haeckel.
Tympaniscus quadrupes, Haeckel.
Octolympanum octonarium, Haeckel.
Paratympanum decastylum, Haeckel.
Prismatium tripodium, Haeckel.
Pseudocubus octostylus, Haeckel.
Lithocubus astragalus, Haeckel.
„ *octacanthus*, Haeckel.
Eutympanium musicantum, Haeckel.
Circolympanum octogonium, Haeckel.

c. Spyroidea.

Trispyris cortina, Haeckel.
„ *furcata*, Haeckel.
„ *capilata*, Haeckel.
Tristylospyris palmipes, Haeckel.
Stephanospyris cordata, Haeckel.
Triceraspyris tripodiscus, Haeckel.
Cephalospyris ovata, Haeckel.
Dorcadospyris dentata, Haeckel.
„ *antilope*, Haeckel.

Cantharospyris platybursa, Haeckel.
Aegospyris æquispina, Haeckel.
Elaphrospyris cervicornis, Haeckel.
„ *capricornis*, Haeckel
„ *alcicornis*, Haeckel
Petalospyris anthemis, Haeckel.
„ *papillata*, Haeckel.
Ceratospyris polygona, Haeckel.
Circospyris nucula, Haeckel.
Dictyospyris spinulosa, Ehrenberg.
„ *quadriloba*, Haeckel.
„ *mammillaris*, Haeckel.
Tiarospyris pervia, Haeckel.
Tholospyris ramosa, Haeckel.
Acrospyris clathrocanium, Haeckel.
„ *fragilis*, Haeckel.
Desmospyris cyrtocolpos, Haeckel.
Phormospyris trifoliata, Haeckel.
Androspyris anthropiscus, Haeckel.
Lamprospyris darwinii, Haeckel.
„ *spenceri*, Haeckel.
Amphispyris sternalis, Haeckel.
Nephrospyris paradictyum, Haeckel.
„ *cordata*, Haeckel.

d. Botryodea.

Botryopera cyrtoloba, Haeckel.
Cannobotrys cortina, Haeckel.
„ *monocanna*, Haeckel.
Botryocyrtis theocampe, Haeckel.
„ *cerebellum*, Haeckel.
Botryopyle dictyocephalus, Haeckel.
Acrobotrys disolenia, Haeckel.
„ *auriculata*, Haeckel.
Lithobotrys orchidea, Haeckel.
Botryocampe camerata, Haeckel.

e. Cyrtoidea.

Tripocalpis triserrata, Haeckel.
„ *cortinaris*, Haeckel.
Tripterocalpis phylloptera, Haeckel.
„ *ogmoptera*, Haeckel.
Trissopilium lithomelissa, Haeckel.
Tripilidium hemisphæricum, Haeckel.
„ *lychnocanium*, Haeckel.
„ *costatum*, Haeckel.
Tripodiscium ovatum, Haeckel.
„ *sphærocephalum*, Haeckel.
Tridictyopus vatillum, Haeckel.
Euscenium quadratum, Haeckel.
Euscenium ramosum, Haeckel. Station 271.
Cladoscenium verticillatum, Haeckel.
Pteroscenium arcuatum, Haeckel.
„ *arcadophorum*, Haeckel.
Archipera bicornis, Haeckel.
Peridium spinipes, Haeckel.
„ *palmipes*, Haeckel.
Peripyramis circumtexta, Haeckel.
„ *spongiosa*, Haeckel.
Carpocanistrum novenum, Haeckel.
Haliphormis costata, Haeckel.
Halicalyptra spinosa, Haeckel.
Phænoscenium hexapodium, Haeckel.
Calpophæna tetracorethra, Haeckel.
Archiphæna stephanoma, Haeckel.
„ *corona*, Haeckel.
Cornutella mitra, Haeckel.
„ *annulata*, Haeckel.
„ *spiralis*, Haeckel.
Cornutanna orthoconus, Haeckel.
Cyrtocalpis ovulum, Haeckel.
Halicapsa triglochin, Haeckel.
Archicapsa triforis, Haeckel.
Dictyophimus plectaniscus, Haeckel.
Sethopilium macropus, Haeckel.
Tripocyrtis tripodiscus, Haeckel.
Lithomelissa bütschlii, Haeckel.
„ *macroceras*, Haeckel.
„ *thoracites*, Haeckel.
Psilomelissa calvata, Haeckel.
Clathrocanium diadema, Haeckel.
„ *squarrosum*, Haeckel.
„ *triomma*, Haeckel.
Lamprodiscus monoceros, Haeckel.
Lampromitra coronata, Haeckel.
Callimitra annæ, Haeckel.
Clathrocorys murrayi, Haeckel.
Lychnocanium lanterna, Haeckel.
„ *tripodium*, Haeckel.
Lychnodictyum wyvillei, Haeckel.
Lithopera globosa, Haeckel.
Sethomelissa hymenoptera, Haeckel.
Sethophormis rotula, Haeckel.
„ *aurelia*, Haeckel.
Sethamphora costata, Haeckel.
Sethopyramis maxima, Haeckel.
Plectopyramis dodecomma, Haeckel.
Spongopyramis spongiosa, Haeckel.
Acanthocorys dodecaster, Haeckel.
Arachnocorys trifida, Haeckel.

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Arachnacorys polyptera, Haeckel.
Anthocyrtium chrysanthemum, Haeckel.
,, *flosculus*, Haeckel.
Anthocyrtidium cineraria, Haeckel.
Carpocanium cylindricum, Haeckel.
,, *petalospyris*, Haeckel.
,, *diadema*, Haeckel.
Sethophæna enneaptera, Haeckel.
Clistophæna polyolena, Haeckel.
Sethoconus mitra, Haeckel.
Sethocyrtis oxycephalis, Haeckel.
Sethocorys patrocli, Haeckel.
,, *amphora*, Haeckel.
Lophophæna liothorax, Haeckel.
Dictyocephalus amphora, Haeckel.
,, *tabulatus*, Haeckel.
,, *globiceps*, Haeckel.
Sethocapsa pyriformis, Haeckel.
Pterocorys aquila, Haeckel.
,, *columba*, Haeckel.
,, *pipetta*, Haeckel.
,, *macroptera*, Haeckel.
Corocalyptra elisabethæ, Haeckel.
Dictyoceras insectum, Haeckel.
,, *virchowii*, Haeckel.
Pteropilium clathrocanium, Haeckel.
Pterocanium orcinum, Haeckel.
,, *virgineum*, Haeckel.
,, *proserpinæ*, Haeckel.
,, *contiguum*, Haeckel.
,, *pyramis*, Haeckel.
Pleuropodium cortina, Haeckel.
Podocyrtis tripodiscus, Haeckel.
,, *costata*, Haeckel.
,, *scaphopodia*, Haeckel.
,, *aurena*, Haeckel.
,, *conulus*, Haeckel.
,, *flosculata*, Haeckel.
,, *farosa*, Haeckel.
,, *lithoconus*, Haeckel.
Dictyopodium scaphopodium, Haeckel.
Lithornithium cicomia, Haeckel.
Sethornithium dictyopterum, Haeckel
Theopera fusiformis, Haeckel.
Rhopalocanium cortinium, Haeckel.
Lithochytris galeata, Haeckel.
,, *lucerna*, Haeckel.
Theophormis senaria, Haeckel.
Pharmacyrtis carinata, Haeckel.
Alacorys octacantha, Haeckel.
Cycladophora pantheon, Haeckel.
Calocyclas vestalis, Haeckel.
,, *monumentum*, Haeckel.
Lamprocyclas nuptialis, Haeckel.
Diplocyclas bicorona, Haeckel.
Theoconus jovis, Haeckel.
,, *longicornis*, Haeckel.
,, *triadnes*, Haeckel.
Lophoconus hexagonalis, Haeckel.
,, *cornutella*, Haeckel.
Theocyrtis microtheca, Haeckel.
,, *barbadensis*, Haeckel.
,, *cylindrica*, Haeckel.
Tricolocampe stenozona, Haeckel.
,, *amphizona*, Haeckel.
,, *cylindrica*, Haeckel.
,, *polyzona*, Haeckel.
,, *urnula*, Haeckel.
,, *arcta*, Haeckel.
Axocorys macroceros, Haeckel.
Theocorys veneris, Haeckel.
,, *ovata*, Haeckel.
,, *tuberculata*, Haeckel.
Lophocorys astrocephala, Haeckel.
Theocampe megalopora, Haeckel.
,, *sphærothorax*, Haeckel.
Theocapsa democriti, Haeckel.
,, *mülleri*, Haeckel.
,, *darwinii*, Haeckel.
,, *galeni*, Haeckel.
,, *wottonis*, Haeckel.
,, *malpighii*, Haeckel.
Tricolocapsa theophrasti, Haeckel.
Phrenocodon diaphragma, Haeckel.
Stichopilium bicorne, Haeckel.
,, *pectinatum*, Haeckel.
Artopilium elegans, Haeckel.
Podocampe tricteuota, Haeckel.
,, *conica*, Haeckel.
Stichopera verticillata, Haeckel.
,, *pectinata*, Haeckel.
Artopera motacilla, Haeckel.
Stichophormis lucerna, Haeckel.
,, *radiata*, Haeckel.
,, *novena*, Haeckel.
Phormocampe campanula, Haeckel.
,, *eucalyptra*, Haeckel.
Cyrtophormis cornuta, Haeckel.
,, *cylindrica*, Haeckel
Stichophæna darwiniana, Haeckel.

Lithostrobus cornutus, Haeckel.
„ *hexastichus*, Haeckel.
„ *cyrtoceras*, Haeckel.
„ *seriatus*, Haeckel.
„ *quadratus*, Haeckel.
Artostrobus articulatus, Haeckel.
Dictyomitra costata, Haeckel.
Stichocorys huschkei, Haeckel.
Lithomitra chrysalis, Haeckel.
„ *nodosaria*, Haeckel.
„ *infundibulum*, Haeckel.
Eucyrtidium hexagonatum, Haeckel.
„ *hertwigii*, Haeckel.
„ *teuscheri*, Haeckel.
„ *stöhrii*, Haeckel.
„ *doliolum*, Haeckel.
„ *bütschlii*, Haeckel.
„ *galatheæ*, Haeckel.
„ *conostoma*, Haeckel.
Eusyringium cannostoma, Haeckel.
„ *conosiphon*, Haeckel.
Lithocampe ovata, Haeckel.
„ *fusiformis*, Haeckel
„ *hexacola*, Haeckel.
Spirocyrtis scalaris, Haeckel.
„ *hemispira*, Haeckel.
„ *merospira*, Haeckel.
Spirocampe polyspira, Haeckel.
Cyrtocapsa colatractus, Haeckel.
„ *chrysalidium*, Haeckel.
Stichocapsa pyriformis, Haeckel.
„ *cylindrica*, Haeckel.

III. PHÆODARIA.

Dictyocha triommata, Ehrenberg.
Distephanus pentasterias, Haeckel.
Aulospathis variabilis, Haeckel.
Sagosphæra coronilla, Haeckel.
Aulosphæra dendrophora, Haeckel.
„ *spinosa*, Haeckel.
Auloscena mirabilis, Haeckel.
Aulastrum polyceros, Haeckel.
Cannosphæra pacifica, Haeckel.
Challengeria bidens, Haeckel.
Challengeron monodon, Haeckel.
„ *crosbiei*, Haeckel.
Cortinetta tripodiscus, Haeckel.
Polypetta tabulata, Haeckel.
Circoporus hexastylus, Haeckel.
Haeckeliana murrayana, Haeckel.
Conchidium terebratula, Haeckel.
Conchonia triodon, Haeckel.
Conchopsis lenticula, Haeckel.
Cœlodendrum serratum, Haeckel.
Cœlothamnus maximus, Haeckel.
Cœlographis sagittella, Haeckel.
Cœlospathis octostyla, Haeckel.
Cœlagalma mirabile, Haeckel.

DIATOMACEÆ.—The following species were observed by Mr. Comber.

Nitzschia marina, Grunow.
Thalassiothrix longissima, Grunow.
Synedra doliolus, Wallich.
Actinocyclus punctulatus, Castracane.
„ *denticulatus*, Castracane.
„ *elongatus*, Grunow (= *Coscinodiscus humilis*, Rattray, = *Willemoesia* Castracane).
Asterolampra marylandica, Ehrenberg.
Asteromphalus elegans, Greville.
„ *stellatus*, Ralfs.
„ *imbricatus*, Wallich.
„ *roperianus*, Ralfs.
Coscinodiscus leptopus, Janisch.
„ *excentricus*, Ehrenberg, var. *punctifera*, Grunow.
Coscinodiscus curvatulus, Grunow, var. *recta*, Rattray.
„ *concinnus*, Smith.
„ *fimbriatus*, Ehrenberg.
„ *obscurus*, A. Schmidt.
„ *nodulifer*, Janisch.
„ *africanus*, Janisch.
„ sp. (?).
Ethmodiscus sp. (?).
Roperia tessellatus, Grunow.
Triceratium flexuosum, Greville.
Hemidiscus cuneiformis, Wallich.
Rhizosolenia styliformis, Brightwell.
Bacteriastrum spirillum, Castracane.

STATION 271. ORGANISMS FROM SURFACE NETS

Surface Organisms.—The following species of Radiolaria are recorded from the surface at this Station :—

RADIOLARIA (Haeckel, Zool. pt. 40).

I. SPUMELLARIA.

a. Colloidea.

Actissa princeps, Haeckel.

b. Beloidea.

Thalassoxanthium cervicorne, Haeckel.
Belonozoum bacillosum, Haeckel.
Rhaphidozoum pacificum, Haeckel.

c. Sphæroidea.

Cœnosphæra primordialis, Haeckel.
,, *antholithea*, Haeckel.
,, *tenerrima*, Haeckel.
,, *inermis*, Haeckel.
,, *favosa*, Haeckel.
,, *vesparia*, Haeckel.
,, *bombus*, Haeckel.
,, *setosa*, Haeckel.
,, *proserpinæ*, Haeckel.
,, *elysia*, Haeckel.
,, *papillata*, Haeckel.
,, *antiqua*, Haeckel.
Stigmosphæra actinocentra, Haeckel.
Ethmosphæra stenosiphonia, Haeckel.
,, *conosiphonia*, Haeckel.
,, *leptosiphonia*, Haeckel.
Carposphæra cerasus, Haeckel.
,, *capillacea*, Haeckel.
,, *infundibulum*, Haeckel.
,, *nobilis*, Haeckel.
,, *nodosa*, Haeckel.
Liosphæra polypora, Haeckel.
Thecosphæra triplodictyon, Haeckel.
Cromyosphæra conifera, Haeckel.
Styptosphæra spongiacea, Haeckel.
Plagiosphæra maxima, Haeckel.
,, *exodictyon*, Haeckel.
Collosphæra primordialis, Haeckel.
,, *pyriformis*, Haeckel.
,, *polyedra*, Haeckel.
Trilonosphæra centripetalis, Haeckel.
Siphonosphæra macrosiphonia, Haeckel.
Caminosphæra furcata, Haeckel.
Solenosphæra amalthea, Haeckel.
Otosphæra polymorpha, Haeckel.
,, *auriculata*, Haeckel.
Coronosphæra convolvulus, Haeckel.
Xiphosphæra planeta, Haeckel.
,, *gæa*, Haeckel.
,, *venus*, Haeckel.
,, *luna*, Haeckel.
Xiphostylus motacilla, Haeckel.
Saturnalis annularis, Haeckel.
Sphærostylus hippocampus, Haeckel.
Amphisphæra neptunus, Haeckel.
,, *cronos*, Haeckel.
,, *pluto*, Haeckel.
Cromyostylus gladius, Haeckel.
Spongostylus hastatus, Haeckel.
Staurosphæra thomæ, Haeckel.
,, *matthæi*, Haeckel.
Staurostylus latinus, Haeckel.
Staurolonche spinozæ, Haeckel.
Staurolonchidium artioscelides, Haeckel.
,, *perspicuum*, Haeckel.
Stauracontium tetracanthum, Haeckel.
Staurodoras spongosphæra, Haeckel.
Hexastylus phænaxonius, Haeckel.
,, *biantis*, Haeckel.
Hexalonche amphisiphon, Haeckel.
,, *xenophanis*, Haeckel.
Hexancistra mirabilis, Haeckel.
Hexacontium axophænum, Haeckel.
,, *papillosum*, Haeckel.
,, *lævigatum*, Haeckel.
,, *floridum*, Haeckel.
Hexacromyum elegans, Haeckel.
Acanthosphæra tenuis, Haeckel.
,, *macropora*, Haeckel.
,, *insignis*, Haeckel.
,, *capillaris*, Haeckel.
,, *gibbosa*, Haeckel.
Heliosphæra polygonaria, Haeckel.
Coscinomma amphisiphon, Haeckel.
,, *macrosiphon*, Haeckel.
Cladococcus penicillus, Haeckel.
,, *scoparius*, Haeckel.
,, *pinetum*, Haeckel.
Haliomma favosum, Haeckel.
,, *datura*, Haeckel.
,, *macrodoras*, Haeckel.

Haliomma wyvillei, Haeckel.
„ *longispinum*, Haeckel.
Heliosoma radians, Haeckel.
„ *elegans*, Haeckel.
„ *longispina*, n.sp., MS.
Elatomma pinetum, Haeckel.
„ *juniperinum*, Haeckel.
Leptosphæra serrata, Haeckel.
Diplosphæra hexagonalis, Haeckel.
Drymosphæra dendrophora, Haeckel.
Astrosphæra hexagonalis, Haeckel.
Actinomma hexagonium, Haeckel.
„ *anthomma*, Haeckel.
„ *capillaceum*, Haeckel.
„ *japonicum*, Haeckel.
Pityomma scoparium, Haeckel.
Arachnopila hexagonella, Haeckel.
Arachnosphæra dolichacantha, Haeckel.
„ *increscens*, Haeckel.
Spongothamnus scoparius, Haeckel.
Rhizoplegma radicatum, Haeckel.
Lychnosphæra regina, Haeckel.
Centrocubus octostylus, Haeckel.
Octodendron spathillatum, Haeckel.
Rhizosphæra serrata, Haeckel.
„ *trigonacantha*, Haeckel.

d. Prunoidea.

Ellipsidium opuntia, Haeckel.
Lithatractus conifer, Haeckel.
Druppatractus hippocampus, Haeckel.
„ *ichthydium*, Haeckel.
„ *belone*, Haeckel.
Stylatractus papillosus, Haeckel.
Spongodruppa terebintha, Haeckel.
Cyphonium ethmarium, Haeckel.
Cypassis puella, Haeckel.
Cyphocolpus virginis, Haeckel.
Cyphinidium amphistylium, Haeckel.
Panartus quadrijugus, Haeckel.
Panarium pipettarium, Haeckel.
Ommatartus amphisiphon, Haeckel.
Zygartus doliolum, Haeckel.

e. Discoidea.

Cenodiscus phacoides, Haeckel.
Theodiscus christianus, Haeckel.
Sethodiscus phacoides, Haeckel.
Phacodiscus rotula, Haeckel.
Sethostaurus rhombostaurus, Haeckel.
„ *gigas*, Haeckel.

Heliosestrum octonum, Haeckel. STATION 271.
„ *craspedotum*, Haeckel.
Astrosestrum pelagium, Haeckel.
Heliodiscus asteriscus, Haeckel.
„ *helianthus*, Haeckel.
„ *pacificus*, n.sp., MS.
„ *speciosus*, n.sp., MS.
Heliodrymus dendrocyclus, Haeckel.
„ *viminalis*, Haeckel.
Astrophacus asteriscus, Haeckel.
Staurocyclia phacostaurus, Haeckel.
Pentactura astropecten, Haeckel.
Echinactura goniaster, Haeckel.
Porodiscus orbiculatus, Haeckel.
„ *concentricus*, Haeckel.
„ *flustrella*, Haeckel.
„ *spiralis*, Haeckel.
„ *semispiralis*, Haeckel.
Amphymenium zygartus, Haeckel.
Hymeniastrum euclidis, Haeckel.
Ommatodiscus circularis, Haeckel.
„ *obscurus*, n.sp., MS.
„ *ovatus*, n.sp., MS.
Stomatodiscus osculatus, Haeckel.
Stylodictya gracilis, Haeckel.
„ *stellata*, Haeckel.
Rhopalastrum pacificum, n.sp., MS.
Euchitonia stöhrii, Haeckel.
Hagiastrum mohammedis, Haeckel.
Tessarastrum spinozæ, Haeckel.
Dicranastrum furcatum, Haeckel.
„ *wyvillei*, Haeckel.
Myelastrum medullare, Haeckel.
„ *octocorne*, Haeckel.
„ *giganteum*, Haeckel.
„ *rotula*, Haeckel.
Triolena hexabelone, Haeckel.
Hexapyle hexacantha, Haeckel.
Spongodiscus favus, Haeckel.
„ *spiralis*, Haeckel.
Spongostaurus quadratus, Haeckel.
Stylotrochus craticulatus, Haeckel.
Spongotrochus multispinus, Haeckel.
„ *parma*, Haeckel.
Rhopalodictyum curvatum, Haeckel.
Dictyocoryne tetradiscus, Haeckel.
Spongasteriscus clavatus, Haeckel.
„ *ovatus*, Haeckel.
Spongaster tetras, Haeckel.
„ *quadratus*, Haeckel.

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f. Larcoidea.

Larcidium axacanthum, Haeckel.
Larnacilla subglobosa, Haeckel.
Larnacostupa spinosa, Haeckel.
Monozonium primordiale, Haeckel.
Amphipyle tetraceros, Haeckel.
„ *octoceros*, Haeckel.
„ *stenoptera*, Haeckel.
Tetrapyle quadricornis, Haeckel.
Octopyle tetraptera, Haeckel.
Pylonium quadricorne, Haeckel.
Amphitholus artidium, Haeckel.
Zonarium tetratholium, Haeckel.
Spirema melonia, Haeckel.
Litholius solaris, Haeckel.
Larcospira olira, Haeckel.
Pylospira octopyle, Haeckel.
Streblonia pulvinulina, Haeckel.
Phorticium spironium, Haeckel.

II. Acantharia.

Actinelius primordialis, Haeckel.
Acanthometron cylindricum, Haeckel.
„ *bulbiferum*, Haeckel.
Zygacantha costata, Haeckel.
Acanthonia denticulata, Haeckel.
„ *diplopyramis*, Haeckel.
„ *stellata*, Haeckel.
Phractacantha bifurca, Haeckel.
Doracantha dorataspis, Haeckel.
Phatnacantha octodon, Haeckel.
Acanthostaurus æqualorialis, Haeckel.
Belonostaurus quadratus, Haeckel.
Lonchostaurus crystallinus, Haeckel.
Zygostaurus sagittalis, Haeckel.
Lithoptera lamarckii, Haeckel.
„ *dodecaptera*, Haeckel.
Amphilonche heteracantha, Haeckel.
„ *conica*, Haeckel.
„ *acufera*, Haeckel.
Acantholonche amphipolaris, Haeckel.
Dorataspis fusigera, Haeckel.
„ *typica*, Haeckel.
Diporaspis zygopora, Haeckel.
Hystrichaspis dorsata, Haeckel.
Lychnaspis maxima, Haeckel.
Icosaspis cruciata, Haeckel.
Hylaspis coronatus, Haeckel.
Belonaspis datura, Haeckel.
Xexalaspis heliodiscus, Haeckel.
Hexonaspis hastata, Haeckel.
Diploconus amalla, Haeckel.

III. Nassellaria.

a. Stephoidea.

Cystidium lecythium, Haeckel.
Tetraplecta pinigera, Haeckel.
Periplecta cortina, Haeckel.
Polyplecta heptacantha, Haeckel.
Archicircus quadratus, Haeckel.
„ *hertwigii*, Haeckel.
„ *sexangularis*, Haeckel.
Dendrocircus arborescens, Haeckel.
Zygocircus rhombicus, Haeckel.
Cortina furcata, Haeckel.
Semantis biforis, Haeckel.
Semantidium hexasloma, Haeckel.
Clathrocircus decaporus, Haeckel.
Zygostephanus dissocircus, Haeckel.
Eucoronis nephrospyris, Haeckel.
Plectocoronis pentacantha, Haeckel.
Prolympanium primordiale, Haeckel.
Tympanidium spinosum, Haeckel.
Dyslympanium dictyocha, Haeckel.
Prismatium tripodium, Haeckel.
Eulympanium musicantum, Haeckel.

b. Spyroidea.

Tripospyris capitata, Haeckel.
Tristylospyris palmipes, Haeckel.
„ *ramosa*, Haeckel.
Stephanospyris cordata, Haeckel.
Tessarospyris clathrobursa, Haeckel.
Aegospyris æquispina, Haeckel.
Elaphrospyris capricornis, Haeckel
„ *alcicornis*, Haeckel.
Petalospyris floscula, Haeckel.
Anthospyris aculeata, Haeckel.
Ceratospyris calorrhiza, Haeckel.
Dictyospyris mammillaris, Haeckel.
Tiarospyris pervia, Haeckel.
Tricolospyris kantiana, Haeckel.
Nephrospyris phaseolus, Haeckel.
„ *cordata*, Haeckel.

c. Botryodea.

Cannobotrys monocanna, Haeckel.
Botryocyrtis theocampe, Haeckel.
„ *cerebellum*, Haeckel.
Botryocampe inflata, Haeckel.
„ *theocapsa*, Haeckel.

d. Cyrtoidea.

Tripterocalpis ogmoptera, Haeckel.
Tripilidium costatum, Haeckel.
Tripodiscium clavatum, Haeckel.
Tridictyopus vatillum, Haeckel.
Euscenium quadratum, Haeckel.
Pteroscenium arcadophorum, Haeckel.
„ *pinnatum*, Haeckel.
Peridium spinipes, Haeckel.
„ *palmipes*, Haeckel.
Peripyramis spongiosa, Haeckel.
Litharachnium araneosum, Haeckel.
Cladarachnium ramosum, Haeckel.
Arachnocalpis ellipsoides, Haeckel.
Calpophæna enneaphylla, Haeckel.
Carpocanistrum novenum, Haeckel.
Phænocalpis petalospyris, Haeckel.
Cornutella hexagona, Haeckel.
„ *sethoconus*, Haeckel.
„ *mitra*, Haeckel.
„ *annulata*, Haeckel.
Cornutanna orthoconus, Haeckel.
Archicorys galea, Haeckel.
Mitrocalpis palliata, Haeckel.
Dictyophimus hertwigii, Haeckel.
„ *cienkowskii*, Haeckel.
Tripocyrtis tripodiscus, Haeckel.
Lithomelissa macroceras, Haeckel.
Clathrocanium squarrosum, Haeckel.
„ *triomma*, Haeckel.
Eucecryphalus halicalyptra, Haeckel.
Amphiplecta callistoma, Haeckel.
Lithopera bacca, Ehrenberg.
Lychnocanium tripodium, Haeckel.
„ *ovatum*, Haeckel.
Clathrolychnus periplectus, Haeckel.
Sethophormis cruciata, Haeckel.
„ *eupilium*, Haeckel.
Sethamphora serrata, Haeckel.
Acanthocorys macropodia, Haeckel.
„ *macroceras*, Haeckel.
Arachnocorys discoides, Haeckel.
„ *araneosa*, Haeckel.
„ *polyptera*, Haeckel.
Carpocanium irregulare, Haeckel.
„ *diadema*, Haeckel.
Sethoconus trochus, Haeckel.
„ *pileus*, Haeckel.
„ *rayianus*, Haeckel.
„ *facetus*, Haeckel.
Sethoconus setosus, Haeckel. Station 271.
„ *venosus*, Haeckel.
„ *mitra*, Haeckel.
Periarachnium periplectum, Haeckel.
Sethocyrtis diomedis, Haeckel.
Pterocorys campanula, Haeckel.
„ *rhinoceros*, Haeckel.
„ *carinata*, Haeckel.
Theopilium tricostatum, Haeckel.
Corocalyptra ludovicæ, Haeckel.
Dictyoceras virchowii, Haeckel.
Pteropilium stratiotes, Haeckel.
Pterocanium proserpinæ, Haeckel.
Dictyocodon palladius, Haeckel.
Podocyrtis favosa, Haeckel.
„ *lithoconus*, Haeckel.
Thyrsocyrtis trifida, Haeckel.
Theophormis callipilium, Haeckel.
Phormocyrtis carinata, Haeckel.
Alacorys octacantha, Haeckel.
Clathrocyclas semeles, Haeckel.
„ *coscinodiscus*, Haeckel.
Theoconus jovis, Haeckel.
Lophoconus cornutella, Haeckel.
Theocyrtis trachelius, Haeckel.
Tricolocampe stenozona, Haeckel.
Theocampe stenostoma, Haeckel.
„ *megalophora*, Haeckel.
Theocapsa galeni, Haeckel.
Artopilium elegans, Haeckel.
Pteropilium pyramis, Haeckel.
Podocampe trictenota, Haeckel.
Stichophormis radiata, Haeckel.
Phormocampe eucalyptra, Haeckel.
Lithostrobus macroceras, Haeckel.
„ *cornutus*, Haeckel.
Dictyomitra conica, Haeckel.
„ *eurythorax*, Haeckel.
Eucyrtidium bütschlii, Haeckel.
„ *galatheæ*, Haeckel.
Cyrtocapsa chrysalidium, Haeckel.

IV. Phæodaria.

Phæocolla primordialis, Haeckel.
Cannobelos calymmata, Haeckel.
Cannorrhaphis lappacea, Haeckel.
Distephanus mesophthalmus, Haeckel.
Aulacantha tubulosa, Haeckel.
Aulographis triglochin, Haeckel.
Sagena pertusa, Haeckel.

Station 271.

Sagoscena prætorium, Haeckel.
„ *debilis*, Haeckel.
Aularia ternaria, Haeckel.
Medusetta spiralis, Haeckel.
Gazelletta macronema, Haeckel.
„ *orthonema*, Haeckel.
Gazelletta robusta, Haeckel.
Castanella campbelli, Haeckel.
Castanidium willemoesi, Haeckel.
„ *aldrichi*, Haeckel.
Conchidium leptæna, Haeckel.

In addition, the following are recorded in the note-books:—*Ethmodiscus* and other Diatoms, *Pyrocystis noctiluca* and *Pyrocystis fusiformis*, *Peridinium*, *Globigerina*, *Orbulina*, *Hastigerina*, *Pullenia*, *Sphæroidina*, *Pulvinulina*, Hydroids on Pteropod shells, Echinoderm larvæ, *Sagitta*, Aphroditacean and other Annelid larvæ, Calanids, *Saphirina*, and other Copepods, Hyperids, *Oxycephalus*, *Euphausia*, *Lucifer*, *Sergestes*, Zoëæ, *Tiedemannia* [= *Gleba*] and other Pteropods, *Appendicularia*, *Doliolum*. A net sent down to 200 fathoms brought up a few Challengeridæ and many other Radiolaria, along with some very large living Foraminifera, while the tow-net at the weights contained a few Challengeridæ and other deep-water things, a small Scopelid, and a young *Sternoptyx*. Several sharks and many flying fishes were seen.

In one of the Phæodaria (*Conchopsis*) the pseudopodia were seen to ramify through the brownish matter of the phæodium. Some of the Foraminifera shells (*Globigerina*) were filled with zoospores. Most of the *Pulleniæ* were surrounded by a great mass of yellow sarcode, completely obscuring the shells.

Station 272.

Station 272 (Sounding 414), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19).

September 8, 1875; lat. 3° 48′ S., long. 152° 56′ W.

Temperature of air at noon, 80°·8; mean for the day, 78°·8.

Temperature of water:—

	°		°
Surface,	79·0	180 fathoms,	50·5
10 fathoms,	78·8	190 „	49·8
20 „	78·5	200 „	49·2
30 „	78·2	300 „	44·7
40 „	78·2	400 „	42·2
50 „	78·1	500 „	40·4
60 „	77·5	600 „	39·2
70 „	75·4	700 „	38·2
80 „	71·9	800 „	37·3
90 „	67·3	900 „	36·8
100 „	63·6	1000 „	36·4
110 „	60·4	1100 „	36·0
120 „	57·5	1200 „	35·7
130 „	55·4	1300 „	35·5
140 „	54·0	1400 „	35·3
150 „	52·9	1500 „	35·1
160 „	52·0	Bottom,	35·1
170 „	51·2		

Density at 60° F. :— STATION 272.

Surface,	1·02650	300 fathoms,	1·02585
25 fathoms,	1·02621	400 „	1·02557
50 „	1·02621	800 „	1·02557
100 „	1·02615	2600 (?) „	1·02561
200 „	1·02575	Bottom,	1·02636

Depth, 2600 fathoms ; deposit, Radiolarian Ooze, containing 10·19 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. shortened and furled sails and got up steam to sound. At 5.30 A.M. sounded in 2600 fathoms. At 7.30 A.M. put trawl over and veered 3200 fathoms. Took serial temperatures down to 1500 fathoms. At 2 P.M. commenced heaving in trawl, which came up at 5.40 P.M. with several specimens, a rounded piece of pumice slightly impregnated with manganese, and two or three irregular manganese nodules with nuclei of pumice. At 6 P.M. made all plain sail. Frigate birds and boatswain birds were seen, supposed to be fishing for flying-fish.

Venus Point, Tahiti, distant at noon, 846 miles. Made good 88 miles. Amount of current 44 miles, direction W.

The following species are recorded in the Zoological Reports from the trawl at Station :— ANIMALS FROM TRAWL.

DEEP-SEA KERATOSA (Haeckel, Zool. pt. 82).

Psammopemma radiolarium, n.sp. Obtained at no other locality.
Stannarium alatum, n.g., n.sp. Obtained at no other locality.
Stannoma dendroides, n.g., n.sp. Obtained also at Station 271.
„ *coralloides*, n.g., n.sp. Obtained also at Station 271.
The genus *Stannoma* was obtained only at these two Stations.

ECHINOIDEA (Agassiz, Zool. pt. 9).

Phormosoma tenue, n.sp. Obtained also at Stations 237 and 274.
Pourtalesia rosea, n.sp. Obtained at no other locality.
Aceste bellidifera, Wyville Thomson, n.g., n.sp. Obtained also at Stations VIII. and 323. Only species of the genus.

ANNELIDA (M'Intosh, Zool. pt. 34).

Myriochele pacifica, n.sp. One specimen ; obtained at no other locality.

MACRURA (Spence Bate, Zool. pt. 52).

Benthesicymus crenatus, n.g., n.sp. One specimen ; obtained also at Station 276, 2350 fathoms.

Station 272.

In addition to the foregoing, the following are recorded in the Station-book :—Two specimens of *Esperia* (?), many specimens of a small globose Sponge, fragments of *Farrea* (?) and of another Sponge, *Stephanoscyphus* on nodules, several specimens of a small Ophiurid, worm-tube (?), and a transparent Ophidiid.

Excluding Protozoa, about 50 specimens of invertebrates and fishes were obtained at this Station, belonging to about 16 species, of which 9 are new to science, including representatives of 4 new genera ; 4 of the new species were not obtained elsewhere.

Organisms from the Deposit.

Radiolaria (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :—

Cenosphæra hexagonalis, Haeckel.
„ *coronata*, Haeckel.
Sethosphæra entosiphonia, Haeckel.
Carposphæra melitomma, Haeckel.
„ *maxima*, Haeckel.
Liosphæra hexagonia, Haeckel.
Thecosphæra maxima, Haeckel.
Chernicosphæra flosculenta, Haeckel.
„ *flammabunda*, Haeckel.
Solenosphæra variabilis, Haeckel.
„ *pandora*, Haeckel.
„ *megalactis*, Haeckel.
Otosphæra auriculata, Haeckel.
Coronosphæra calycina, Haeckel.
Clathrosphæra lamellosa, Haeckel.
Xanthiosphæra erinacea, Haeckel.
„ *lappacea*, Haeckel.
Xiphosphæra planeta, Haeckel.
„ *venus*, Haeckel.
Xiphostylus alauda, Haeckel.
Stylosphæra clio, Haeckel.
Hexastylus pharnaxonius, Haeckel.
„ *dictyotus*, Haeckel.
Hexalonche octahedra, Haeckel.
„ *anaximandri*, Haeckel.
„ *cristata*, Haeckel.
„ *anaximenis*, Haeckel.
Hexadendrum quadricuspis, Haeckel.
Hexacontarium staratum, Haeckel.
Cubosphæra cubaxonia, Haeckel.
Acanthosphæra tenuis, Haeckel.
Heliosphæra hexagonaria, Haeckel.
„ *coronata*, Haeckel.
Conosphæra platycomus, Haeckel.
Staphoscœna staphoceras, Haeckel.
Haliomma compactum, Haeckel.
Cromyodrymus quadricuspis, Haeckel.
Ellipsoxiphus elegans, Haeckel.
„ *claviger*, Haeckel.
Ellipsostylus aquila, Haeckel.
Lithomespilus phlogoides, Haeckel.
Lithatractus fragilis, Haeckel.
„ *leptostylus*, Haeckel.
„ *carduelis*, Haeckel.
„ *lobatus*, Haeckel.
„ *jugatus*, Haeckel.
„ *gamoporus*, Haeckel.
Stylatractus compactus, Haeckel.
„ *variabilis*, Haeckel.
„ *sethoporus*, Haeckel.
Xiphatractus armadillo, Haeckel.
Spongurus tricolus, Haeckel.
Artiscus nodosus, Haeckel.
Cyphonium profundum, Haeckel.
Cyphinidium coronatum, Haeckel.
Panartus tetraplus, Haeckel.
„ *diploconus*, Haeckel.
„ *pluteus*, Haeckel.
Peripanartus palliatus, Haeckel.
„ *cylindrus*, Haeckel.
Panicium scoparium, Haeckel.
Panarium tubularium, Haeckel.
Ommatocampe nereis, Haeckel.
Ommatartus amphicanna, Haeckel.
Zygocampe chrysalidium, Haeckel.
Zygartus chrysalis, Haeckel.
Sethostylus dentatus, Haeckel.
Phacostylus amphistylus, Haeckel.
Triactiscus tripyramis, Haeckel.
Heliosestrum irregulare, Haeckel.
Astrosestrum ephyra, Haeckel.
Heliodiscus trigonodon, Haeckel.
„ *echiniscus*, Haeckel.
Trigonactura rhopalastrella, Haeckel.

Astractura clavigera, Haeckel.
Archidiscus polythalamus, Haeckel.
Axodiscus spinosum, Haeckel.
Porodiscus semispiralis, Haeckel.
Xiphodictya heliospira, Haeckel.
Staurodictya elegans, Haeckel.
Stylodictya perispira, Haeckel.
„ *centrospira*, Haeckel.
Stylochlamydium asteriscus, Haeckel.
Pentalastrum asteracanthion, Haeckel.
Hexinastrum geryonidum, Haeckel.
Triolena primordialis, Haeckel.
Triodiscus trigonus, Haeckel.
Hexapyle triangula, Haeckel.
Discopyle osculata, Haeckel.
Spongotripus strepsiceros, Haeckel.
Stylotrochus geddesii, Haeckel.
Spongolena cypselura, Haeckel.
Dictyocoryne tetradiscus, Haeckel.
Spongaster quadratus, Haeckel.
Coccolarcus lentellipsis, Haeckel.
Trizonium tricinctum, Haeckel.
Octopyle amphistyle, Haeckel.
Amphitholus artiscus, Haeckel.
Zonarium quadrigatum, Haeckel.
Tholospira dendrophora, Haeckel.
Phorticium deforme, Haeckel.
Sorolarcus tetrapylifer, Haeckel.
Triplecta triactis, Hacckel.
Tetraplecta tetrahedra, Haeckel.
Archicircus princeps, Haeckel.
„ *primordialis*, Haeckel.
Cortina dendroides, Haeckel.
Stephanium tetrapus, Haeckel.
Clathrocircus dictyospyris, Haeckel.
„ *multiforis*, Haeckel.
Cortiniscus tripodiscus, Haeckel.
Stephaniscus tetrapodius, Haeckel.
Coronidium cervicorne, Haeckel.
Eucoronis angulata, Haeckel.
Toxarium circospyris, Haeckel.
Microcubus dodecastoma, Haeckel.
„ *amphispyris*, Haeckel.
Octotympanum cervicorne, Haeckel.
Tympaniscus corona, Haeckel.
Parastephanus asymmetricus, Haeckel.
Pseudocubus hexapylus, Haeckel.
Triceraspyris tripodiscus, Haeckel.
Tristylospyris clavipes, Haeckel.
Cephalospyris cancellata, Haeckel.

Dipospyris cubus, Haeckel.
Dorcadospyris dentata, Haeckel.
„ *antilope*, Hacckel.
Tetraspyris stephanium, Haeckel.
Clathrospyris pyramidalis, Haeckel.
Aegospyris æquispina, Haeckel.
Petalospyris anthemis, Haeckel.
„ *dinoceras*, Haeckel.
Anthospyris mammillata, Haeckel.
Dictyospyris stalactites, Haeckel.
„ *spinulosa*, Ehrenberg.
„ *quadriloba*, Haeckel.
Tholospyris tripodiscus, Haeckel.
Phormospyris tricostata, Haeckel.
Desmospyris mammillata, Haeckel.
Androspyris pithecus, Haeckel.
Lamprospyris spenceri, Haeckel.
Amphispyris toxarium, Haeckel.
Perispyris lentellipsis, Haeckel.
Nephrospyris renilla, Haeckel.
Botryopera cyrtoloba, Haeckel.
Cannobotrys cortina, Haeckel.
Botryopyle dictyocephalus, Haeckel.
Acrobotrys disolenia, Haeckel.
„ *acuminata*, Haeckel.
Botryocella quadricellaris, Haeckel.
Phormobotrys pentathalamia, Haeckel.
Tripodonium ovatum, Haeckel.
Tripterocalpis conoptera, Haeckel.
Archipilium orthopterum, Haeckel.
Tripilidium cortina, Haeckel.
Tripodiscium sphærocephalum, Haeckel.
Euscenium quadratum, Haeckel.
Pteroscenium macropodium, Haeckel.
Peridium alatum, Haeckel.
Archipera pentacantha, Haeckel.
Archibursa tripodiscus, Haeckel.
Bathropyramis quadrata, Haeckel.
Halicalyptra castanella, Haeckel.
Carpocanistrum evacuatum, Haeckel.
Phænoscenium cladopodium, Haeckel.
Archicorys galea, Haeckel.
Cyrtocalpis sethopora, Haeckel.
Halicapsa triglochin, Haeckel.
Archicapsa nonaforis, Haeckel.
Dictyophimus cortina, Haeckel.
Lithomelissa bütschlii, Haeckel.
Psilomelissa calvata, Haeckel.
„ *sphærocephala*, Haeckel.
Clathrocanium triomma, Haeckel.

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Lampromitra dendrocorona, Haeckel.
Callimitra elisabethæ, Haeckel.
Clathrocorys teuscheri, Haeckel.
Lychnocanium fenestratum, Haeckel.
„ *pudicum*, Haeckel.
Lychnolictyum wyrillei, Haeckel.
Peromelissa psilocrana, Haeckel.
Sethophormis asteriscus, Haeckel.
„ *rotula*, Haeckel.
„ *aurelia*, Haeckel.
Sethamphora costata, Haeckel.
Spongopyramis spongoplecta, Haeckel.
Acanthocorys triloba, Haeckel.
Anthocyrtis orata, Haeckel.
Anthocyrtium chrysanthemum, Haeckel.
„ *floseulus*, Haeckel.
Anthocyrtidium ligularia, Haeckel.
Carpocanium gemmula, Haeckel.
„ *virgineum*, Haeckel.
Clistophæna polyolena, Haeckel.
Sethocyrtis oxycephalis, Haeckel.
Sethocorys patrocli, Haeckel.
„ *odysseus*, Haeckel.
Lophophæna liothorax, Haeckel.
Dictyocephalus amphora, Haeckel.
Sethocapsa pyriformis, Haeckel.
Dicolocapsa megacephala, Haeckel.
Pterocorys hirundo, Haeckel.
Dictyoceras insectum, Haeckel.
„ *bombus*, Haeckel.
Pteropilium hoplites, Haeckel.
Pterocanium orcinum, Haeckel.
Pterocodon favosus, Haeckel.
Podocyrtis tripodiscus, Haeckel.
„ *costata*, Haeckel.
„ *scaphopodia*, Haeckel.
Lithornithium fringilla, Haeckel.
Theopera fusiformis, Haeckel.
Phormocyrtis costata, Haeckel.
Cycladophora pantheon, Haeckel.
Calocyclas casta, Haeckel.
Clathrocyclas alemeæ, Haeckel.
„ *coscinodiscus*, Haeckel.
Lamprocyclas maritalis, Haeckel.
Theconus jovis, Haeckel.
Theocyrtis microtheca, Haeckel.
„ *ptychodes*, Haeckel.
Tricolocampe cylindrica, Haeckel.
„ *polyzona*, Haeckel.
„ *urnula*, Haeckel.
Tricolocampe arcta, Haeckel.
Theocampe sphærothorax, Haeckel.
Theocapsa mülleri, Haeckel.
„ *darwinii*, Haeckel.
Phrenocodon clathrostomium, Haeckel.
Stichopilium cortina, Haeckel.
„ *campanulatum*, Haeckel.
Artopilium stichopterygium, Haeckel.
Podocampe cornuta, Haeckel.
Stichopera lagena, Haeckel.
Phormocampe lamprocyclas, Haeckel.
Stichophæna novena, Haeckel.
Lithostrobus tetrastichus, Haeckel.
„ *hexastichus*, Haeckel.
„ *conulus*, Haeckel.
„ *seriatus*, Haeckel.
„ *quadratus*, Haeckel.
„ *hexagonalis*, Haeckel.
Stichocorys okenii, Haeckel.
Artostrobus articulatus, Haeckel.
Lithonitra nodosaria, Haeckel.
Eucyrtidium hexagonatum, Haeckel.
„ *teuscheri*, Haeckel.
„ *stöhrii*, Haeckel.
Eusyringium siphonostoma, Haeckel.
Siphocampe caminosa, Haeckel.
Lithocampe urceolata, Haeckel.
Spirocyrtis scalaris, Haeckel.
„ *holospira*, Haeckel.
„ *merospira*, Haeckel.
Cyrtocapsa cornuta, Haeckel.
Dictyocha triommata, Ehrenberg.
„ *medusa*, Haeckel.
Distephanus asteroides, Haeckel.
„ *pentasterias*, Haeckel.
Aulospathis variabilis, Haeckel.
Orosphæra hastigera, Haeckel.
Aulosphæra polyodon, Haeckel.
Auloscena mirabilis, Haeckel.
Cannosphæra pacifica, Haeckel.
Challengeria bidens, Haeckel.
Challengeron monodon, Haeckel.
„ *crosbiei*, Haeckel.
Haeckeliana murrayana, Haeckel.
Conchidium terebratula, Haeckel.
Conchopsis lenticulo, Haeckel.
Calodoras octographis, Haeckel.
Calodendrum serratum, Haeckel.
Calospathis octostyla, Haeckel.
Calodecas decastyla, Haeckel.

Surface Organisms.—The following species are recorded from the surface at this Station :— STATION 272. ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Actissa lenticularis, Haeckel.
Collozoum volvocinum, Haeckel.
Thalassosphæra belonium, Haeckel.
Collosphæra primordialis, Haeckel.
„ *pyriformis*, Haeckel (?).
„ *polyedra*, Haeckel.
Siphonosphæra macrosiphonia, Haeckel.
Saturnalis annularis, Haeckel.
Saturnulus circulus, Haeckel.
Saturninus triplex, Haeckel.
Staurosphæra philippi, Haeckel.
Hexalonche xenophanis, Haeckel.
Hexacontium axophænum, Haeckel.
„ *papillosum*, Haeckel.
Hexadendron bipinnatum, Haeckel.
Acanthosphæra insignis, Haeckel.
„ *capillaris*, Haeckel.
Heliosphæra polygonaria, Haeckel.
Cladococcus pinetum, Haeckel.
Haliomma favosum, Haeckel.
„ *datura*, Haeckel.
„ *enneaxiplus*, Haeckel.
„ *longispinum*, Müller.
„ *wyvillei*, Haeckel.
Heliosoma radians, Hacckel.
Elatomma pinetum, Haeckel.
Diplosphæra hexagonalis, Haeckel.
Actinomma hexagonium, Haeckel.
„ *capillaceum*, Haeckel.
Echinomma cidaris, Haeckel.
Arachnopegma longispinum, Haeckel.
Arachnosphæra dolichacantha, Haeckel.
Spongiomma radiatum, Haeckel.
Spongodrymus abietinus, Haeckel.
Octodendron pinetum, Haeckel.
Spongosphæra quadricuspis, Haeckel.
Rhizosphæra serrata, Haeckel.
Cenellipsis primitiva, Haeckel.
Druppatractus hippocampus, Haeckel.
Spongoliva daturina, Haeckel.
Cypassis puella, Haeckel.
Sethodiscus phacoides, Haeckel.
Heliosestrum craspedotum, Haeckel.
Heliodiscus trochiscus, Haeckel.
Porodiscus perispira, Haeckel.
Hymeniastrum euclidis, Haeckel.
Euchitonia triangulum, Haeckel.
Myelastrum decaceros, Hacckel.
Spongotripus regularis, Hacckel.
Stylotrochus helianthus, Haeckel.
Spongotrochus multispinus, Haeckel.
Spongaster scyllæus, Haeckel.
Dizonium octacanthum, Haeckel.
Trizonium dodecabelos, Haeckel.
Tetrapyle quadricornis, Haeckel.
Pylonium quadricorne, Haeckel.
Tholostaurus quadrigatus, Haeckel.
Lithelius solaris, Haeckel.
Phorticium spironium, Haeckel.
Actinelius primordialis, Haeckel.
Acanthometron cylindricum, Haeckel.
„ *bulbiferum*, Haeckel.
Zygacantha costata, Haeckel.
Acanthonia denticulata, Haeckel.
„ *diplopyramis*, Haeckel.
„ *serrulata*, Haeckel.
Xiphacantha trigonoptera, Haeckel.
„ *platyptera*, Haeckel.
Stauracantha tetrastaura, Hacckel.
Lonchostaurus lanceolatus, Haeckel.
Zygostaurus amphithectus, Haeckel.
Xiphoptera dodecactena, Haeckel.
Amphilonche conica, Haeckel.
„ *acufera*, Haeckel.
Amphibelone clavaria, Haeckel.
Acantholonche amphipolaris, Haeckel.
Pleuraspis ramosa, Haeckel.
Dorataspis typica, Haeckel.
Coscinaspis orthopora, Haeckel.
Acontaspis furcata, Haeckel.
Lychnaspis maxima, Haeckel.
Icosaspis cruciata, Haeckel.
Phractopelta hexadopora, Haeckel.
Hexalaspis heliodiscus, Haeckel.
Hexacolpus infundibulum, Haeckel.
Lithocircus tarandus, Haeckel.
Dendrocircus arborescens, Haeckel.
Zygostephanium constrictum, Haeckel.
Protympanium primordiale, Haeckel.
Anthospyris aculeata, Haeckel.

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Arachnocalpis ellipsoides, Haeckel.
Cornutella hexagona, Haeckel.
Cornutanna orthoconus, Haeckel.
Dictyophimus hertwigii, Haeckel.
Eucecryphalus halicalyptra, Haeckel.
Arachnocorys araneosa, Haeckel.
Carpocanium irregulare, Haeckel.
Sethoconus trochus, Haeckel.
„ *pileus*, Haeckel.
„ *rayianus*, Haeckel.
„ *facetus*, Haeckel.
„ *setosus*, Haeckel.
Pterocorys campanula, Haeckel.
„ *rhinoceros*, Haeckel.
Theopilium tricostatum, Haeckel.
Corocalyptra emmæ, Haeckel.
Theophormis senaria, Haeckel.
Cecryphalium lamprodiscus, Haeckel.
Phæocolla primordialis, Haeckel.
Cannobelos calymmata, Haeckel.
Mesocena octogona, Ehrenberg.
Distephanus mesophthalmus, Haeckel.
Aulacantha tubulosa, Haeckel.
Aulographis triglochin, Haeckel.
Sagena pertusa, Haeckel.
Sagoscena prætorium, Haeckel.
„ *debilis*, Haeckel.
Aularia ternaria, Haeckel.
Medusetta spiralis, Haeckel.
Gazelletta macronema, Haeckel.
„ *orthonema*, Haeckel.
„ *robusta*, Haeckel.
Castanarium lyelli, Haeckel.
Castanella campbelli, Haeckel.
Castanidium willemoesi, Haeckel.
„ *aldrichi*, Haeckel.
Conchidium leptæna, Haeckel.

Amphipoda (Stebbing, Zool. pt. 67).
Phronima tenella, n.sp.

The tow-nets procured mostly the same organisms as at the last few Stations, including :—*Pyrocystis*, Diatoms, many *Globigerinæ*, *Orbulina*, Acanthometræ and other Radiolaria, Copepods, *Lucifer*, and other Crustacea, small cuttle-fish. One of the Phæodaria (*Conchopsis*) was observed alive under the microscope; it threw out pseudopodia in the same manner as the Foraminifera. The large brown cells of the phæodium were turned round and round by the motions of the pseudopodia, which attached themselves to the glass and moved the whole shell.

Station 273

Station 273 (Sounding 415), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19).

September 9, 1875; lat. 5° 11′ S., long. 152° 56′ W.
Temperature of air at noon, 79°·8; mean for the day, 79°·2.
Temperature of water :—

Surface,	80°·7	90 fathoms,	71°·9
10 fathoms,	80·4	100 „	68·2
20 „	80·0	110 „	64·0
30 „	79·5	120 „	59·8
40 „	79·4	130 „	56·5
50 „	79·3	140 „	54·3
60 „	79·2	150 „	52·6
70 „	78·5	160 „	51·7
80 „	75·8	170 „	50·7

STATION 273.

180 fathoms,	49·8	600 fathoms,	38·9
190 „	49·3	700 „	38·1
200 „	49·0	800 „	37·5
300 „	44·5	900 „	37·0
400 „	41·8	1000 „	36·5
500 „	40·1	Bottom,	34·5

Density at 60° F. at surface, 1·02638 ; 1900 fathoms, 1·02640.

Depth, 2350 fathoms ; deposit, Radiolarian Ooze, containing 2·00 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Under sail during the forenoon. At 1.20 P.M. shortened and furled sails and got up steam. At 1.30 P.M. sounded in 2350 fathoms. Obtained serial temperatures down to 1000 fathoms. At 4 P.M. completed observations and made sail. Frigate birds and boatswain birds were seen.

Distance at noon from Venus Point, Tahiti, 768 miles. Made good 79 miles. Amount of current 31 miles, direction S. 75° W.

ORGANISMS FROM THE DEPOSIT.

RADIOLARIA (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station :—

Cenosphæra hexagonalis, Haeckel.
Carposphæra melitomma, Haeckel.
Solenosphæra pandora, Haeckel.
„ *megalactis*, Haeckel.
Clathrosphæra lamellosa, Haeckel.
Xanthiosphæra lappacea, Haeckel.
Xiphosphæra planeta, Haeckel.
Stylocromyum amphiconus, Haeckel.
Staurosphæra judæ, Haeckel.
Hexaloncha cristata, Haeckel.
Acanthosphæra tenuis, Haeckel.
Heliosphæra hexagonaria, Haeckel.
Ellipsoxiphus elegans, Haeckel.
Prunulum coccymelium, Haeckel.
Lithatractus carduelis, Haeckel.
„ *gamoporus*, Haeckel.
Stylatractus variabilis, Haeckel.
Cyphonium profundum, Haeckel.
Cyphinidium coronatum, Haeckel
Panartus tetraplus, Haeckel.
Peripanartus cylindrus, Haeckel.
Panicium scoparium, Haeckel.
Ommatocampe nereis, Haeckel.
Ommatartus amphicanna, Haeckel.
Zygocampe chrysalidium, Haeckel.
Zygartus chrysalis, Haeckel.
Astrosestrum ephyra, Haeckel.
Heliodiscus trigonodon, Haeckel.
Trigonactura rhopalastrella, Haeckel.
Astractura clavigera, Haeckel.
Archidiscus polythalamus, Haeckel.
Axodiscus spinosum, Haeckel.
Stylodictya centrospira, Haeckel.
Amphymenium pupula, Haeckel.
Stauralastrum lanceolatum, Haeckel.
Stylotrochus geddesii, Haeckel.
Spongolena rhopalura, Haeckel.
Dictyocoryne tetradiscus, Haeckel.
Spongaster quadratus, Haeckel.
Pylonium nephropylium, Haeckel.
Amphitholonium octostylium, Haeckel
Cubotholus regularis, Haeckel.
Archicircus princeps, Haeckel.
„ *primordialis*, Haeckel.
Cortina dendroides, Haeckel.
Clathrocircus multiforis, Haeckel.
Cortiniscus tripodiscus, Haeckel.
Stephaniscus tetrapodius, Haeckel.
Podocoronis polypodiscus, Haeckel.
Toxarium circospyris, Haeckel.

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Microcubus dodecastoma, Haeckel.
Octotympanum octospinum, Haeckel.
Triceraspyris tripodiscus, Haeckel.
Dorcadospyris dentata, Haeckel.
„ *antilope*, Haeckel.
Acrospyris aquispina, Haeckel.
Dictyospyris spinulosa, Ehrenberg.
„ *quadriloba*, Haeckel.
Androspyris homunculus, Haeckel.
Botryopera cyrtoloba, Haeckel.
Cannobotrys cortina, Haeckel.
Botryopyle dictyocephalus, Haeckel.
Acrobotrys disolenia, Haeckel.
Lithomelissa bütschlii, Haeckel.
Psilomelissa calvata, Haeckel.
Callimitra agnesæ, Haeckel.
Lychnodictyum wyvillei, Haeckel.
Sethophormis rotula, Haeckel.
„ *aurelia*, Haeckel.
Sethamphora costata, Haeckel.
Acanthocorys polypodia, Haeckel.
Anthocyrtium chrysanthemum, Haeckel.
„ *floseulus*, Haeckel.
Clistophæna polyolena, Haeckel.
Sethocyrtis oxycephalis, Haeckel.
Sethocorys patrocli, Haeckel.
Lophophæna liothorax, Haeckel.
Sethocapsa pyriformis, Haeckel.
Dictyoceras insectum, Haeckel.
Pterocanium orcinum, Haeckel.
Podocyrtis scaphopodia, Haeckel.
Theopera fusiformis, Haeckel.
Cyclalophora pantheon, Haeckel.
Theocyrtis microtheca, Haeckel.
Lophocyrtis coronata, Haeckel.
Tricolocampe cylindrica, Haeckel.
„ *urnula*, Haeckel.
„ *arcta*, Haeckel.
Theocampe sphærothorax, Haeckel.
Theocapsa mülleri, Haeckel.
„ *darwinii*, Haeckel.
Stichocampe convergens, Haeckel.
Stichophormis pyramidalis, Haeckel.
Artophæna senaria, Haeckel.
Lithostrobus hexastichus, Haeckel.
„ *seriatus*, Haeckel.
„ *quadratus*, Haeckel.
Artostrobus articulatus, Haeckel.
Lithomitra nodosaria, Haeckel.
Eucyrtidium teuscheri, Haeckel.
„ *stöhrii*, Haeckel.
Spirocyrtis scalaris, Haeckel.
„ *merospira*, Haeckel.
Spirocampe allospira, Haeckel.
Stichocapsa pentacola, Haeckel.
Anlospathis variabilis, Haeckel.
Auloscena mirabilis, Haeckel.
Cannosphæra pacifica, Haeckel.
Challengeria bidens, Haeckel.
Challengeron monodon, Haeckel.
„ *crosbiei*, Haeckel.
Haeckeliana murrayana, Haeckel.
Conchopsis lenticula, Haeckel.
Cœlodendrum serratum, Haeckel.
Cœlospathis octostyla, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species of Radiolaria are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Thalassoxanthium oxodimare, Haeckel.
Collosphæra primordialis, Haeckel.
Xiphostylus cladius, Haeckel.
Saturnalis annularis, Haeckel.
Acanthosphæra insignis, Haeckel.
„ *capillaris*, Haeckel.
Clathrococcus pinetum, Haeckel.
Haliomma furcatum, Haeckel.
„ *datura*, Haeckel.
„ *wyvillei*, Haeckel.
Heliosoma radians, Haeckel.
Diplosphæra hexapodia, Haeckel.
Actinomma hexagonium, Haeckel.
„ *capillaceum*, Haeckel.
Pilyomma scoparium, Haeckel.
Arachnosphæra dolichacantha, Haeckel.
Rhizosphæra serrata, Haeckel.
Cypassis puella, Haeckel.
Sethodiscus phacoides, Haeckel.
Heliosestrum craspedotum, Haeckel.
Heliodiscus trochiscus, Haeckel.
Porodiscus perispira, Haeckel.
Dictyastrum trirhopalum, Haeckel.
Hymeniastrum euclidis, Haeckel.

Spongotrochus multispinus, Haeckel.
Larcarium chætostylum, Haeckel.
Tetrapyle quadricornis, Haeckel.
Pylonium quadricorne, Haeckel.
Phorticium spironium, Haeckel.
Actinelius primordialis, Haeckel.
Acanthometron cylindricum, Haeckel.
„ *bulbiferum*, Haeckel.
Zygacantha costata, Haeckel.
Acanthonia denticulata, Haeckel.
„ *diplopyramis*, Haeckel.
Phatnacantha icosaspis, Haeckel.
Amphilonche conica, Haeckel.
„ *acufera*, Haeckel.
Acantholonche amphipolaris, Haeckel.
Dorataspis typica, Haeckel.
Lychnaspis maxima, Haeckel.
Icosaspis cruciata, Haeckel.
Hexalaspis heliodiscus, Haeckel.
Dendrocircus arborescens, Haeckel.
Protympanium primordiale, Haeckel.
Anthospyris aculeata, Haeckel.
Arachnocalpis ellipsoides, Haeckel.
Cornutella hexagona, Haeckel.
Cornutanna orthoconus, Haeckel.
Dictyophimus hertwigii, Haeckel.
Eucecryphalus halicalyptra, Haeckel. Station 273.
Arachnocorys araneosa, Haeckel.
Carpocanium irregulare, Haeckel.
Sethoconus trochus, Haeckel.
„ *pileus*, Haeckel.
„ *facetus*, Haeckel.
Pterocorys campanula, Haeckel.
„ *rhinoceros*, Haeckel.
Theopilium tricostatum, Haeckel.
Phæocolla primordialis, Haeckel.
Cannobelos calymmata, Haeckel.
Mesocena octogona, Ehrenberg.
Aulacantha tubulosa, Haeckel.
Aulographis triglochin, Haeckel.
Sagena pertusa, Haeckel.
Sagoscena prætorium, Haeckel.
„ *debilis*, Haeckel.
Aularia ternaria, Haeckel.
Gazelletta macronema, Haeckel.
„ *orthonema*, Haeckel.
„ *robusta*, Haeckel.
Castanella campbelli, Haeckel.
Castanidium willemoesi, Haeckel.
„ *aldrichi*, Haeckel.
Conchidium terebratula, Haeckel.

The tow-nets at the surface brought in the usual organisms, and a haul from 200 fathoms gave some of the deep-water Radiolaria. Several flying fishes were observed from the ship.

Station 274 (Sounding 416), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19). Station 274.

September 11, 1875 ; lat. 7° 25′ S., long. 152° 15′ W.
Temperature of air at noon, 81°·5 ; mean for the day, 79°·4.
Temperature of water :—

Surface,	80·2	90 fathoms,	73·7
10 fathoms,	80·0	100 „	69·3
20 „	80·0	110 „	64·7
30 „	80·0	120 „	60·9
40 „	80·0	130 „	57·8
50 „	79·8	140 „	55·1
60 „	79·5	150 „	52·9
70 „	78·6	160 „	51·3
80 „	77·0	170 „	49·9

Station 274.

180 fathoms,	49·2	900 fathoms,	37·1
190 „	48·5	1000 „	36·7
200 „	48·0	1100 „	36·4
300 „	44·6	1200 „	36·1
400 „	42·5	1300 „	35·9
500 „	41·0	1400 „	35·6
600 „	39·5	1500 „	35·3
700 „	38·5	Bottom,	35·1
800 „	37·6		

Density at 60° F. at surface, 1·02656 ; 2275 fathoms, 1·02569.

Depth, 2750 fathoms; deposit, Radiolarian Ooze, containing 3·89 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.15 A.M. shortened and furled sails, and got up steam to sound and trawl. At 6 A.M. sounded in 2750 fathoms. At 7.30 A.M. put trawl over and veered 3350 fathoms. Obtained serial temperatures down to 1500 fathoms. At 2 P.M. commenced heaving in trawl, which came up at 4.20 P.M. with several specimens, over nine litres of compact flattened manganese nodules, with carbones of Cetaceans, sharks' teeth, and pumice fragments. At 4.45 P.M. made sail. Frigate birds, boatswain birds, gannets, and a large bird like a *Procellaria* were seen.

Venus Point, Tahiti, distant at noon, 625 miles ; Caroline Islands, 202 miles ; Vostok Island, 160 miles. Made good 62 miles. Amount of current 18 miles, direction S. 47° W.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Deep-Sea Keratosa (Haeckel, Zool. pt. 82).

Psammina nummulina, n.g., n.sp. Obtained at no other locality.

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Cladorhiza abyssicola, Sars, var. *rectangularis*, nov. One specimen ; obtained at no other locality.

Hexactinellida (Schulze, Zool. pt. 53).

Euplectella crassistellata, n.sp. One specimen ; obtained at no other locality.

Asteroidea (Sladen, Zool. pt. 51).

Hyphalaster hyalinus, n.g., n.sp. Two specimens ; obtained at no other locality.

Echinoidea (Agassiz, Zool. pt. 9).

Phormosoma tenue, n.sp. Obtained also at Stations 237 and 272.

HOLOTHURIOIDEA (Théel, Zool. pt. 13). STATION 274.

Psycheotrephes exigua, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Benthodytes selenkiana, n.g., n.sp. One specimen; obtained at no other locality.

In addition to the foregoing, the following are recorded in the Station-book :— *Stephanoscyphus* and two specimens of a small flat white Actinian adhering to the manganese nodules, *Kophobelemnon* (?), *Antipathes*, four Holothurians of three species (two specimens of two species only noted above).

Excluding Protozoa, about 20 specimens of invertebrates were obtained at this Station, belonging to about 12 species, of which 7 are new to science, including representatives of 4 new genera; 6 of the new species and 1 new genus were not obtained elsewhere.

A specimen of *Nodosaria* which came up in the trawl was alive and filled with sarcode of a brown colour, resembling that of the Phæodaria, and presented several nuclei which coloured in carmine solution.

RADIOLARIA (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station :— ORGANISMS FROM THE DEPOSIT.

Cenosphæra hexagonalis, Haeckel.
„ *marginata*, Haeckel.
Carposphæra melitomma, Haeckel.
Caryosphæra pentalepas, Haeckel.
Trypanosphæra dentata, Haeckel.
Solenosphæra pandora, Haeckel.
„ *megalactis*, Haeckel.
Clathrosphæra lamellosa, Haeckel.
Xanthiosphæra lappacea, Haeckel.
Xiphosphæra planeta, Haeckel.
„ *gæa*, Haeckel.
„ *clavigera*, Haeckel.
Sphærostylus clio, Haeckel.
Spongolonche compacta, Haeckel.
Staurostylus græcus, Haeckel.
Stauracontium papillosum, Haeckel.
Hexalonche octocolpa, Haeckel.
„ *cristata*, Haeckel.
Hexancistra triserrata, Haeckel.
Hexacontium circumtextum, Haeckel.
Acanthosphæra tenuis, Haeckel.
Heliosphæra hexagonaria, Haeckel.
Cromyomma mucronatum, Haeckel.
Ellipsoxiphus elegans, Haeckel.

Lithatractus carduelis, Haeckel.
„ *gamoporus*, Haeckel.
Stylatractus variabilis, Haeckel.
Spongurus stypticus, Haeckel.
Cyphanta hispida, Haeckel.
Cyphonium profundum, Haeckel.
Cyphinidium coronatum, Haeckel.
Panartus tetraplus, Haeckel.
„ *quadriceps*, Haeckel.
Peripanartus lævigatus, Haeckel.
„ *cylindrus*, Haeckel.
Panicium scoparium, Haeckel.
Peripanicium coronarium, Haeckel.
Ommatocampe nereis, Haeckel.
Ommatartus amphicanna, Haeckel.
Zygocampe chrysalidium, Haeckel.
Zygartus chrysalis, Haeckel.
Stylodiscus amphistylus, Haeckel.
Theodiscus trinitatus, Haeckel.
Crucidiscus cruciatus, Haeckel.
Sethodiscus lenticula, Haeckel.
Astrosestrum ephyra, Haeckel.
Heliodiscus trigonodon, Haeckel.
„ *cingillum*, Haeckel.

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Trigonactura rhopalastrella, Haeckel.
Astractura clavigera, Haeckel.
Archidiscus polythalamus, Haeckel.
Axodiscus octogonus, Haeckel.
„ *spinosum*, Haeckel.
Stylodictya centrospira, Haeckel.
Hexalastrum palmanthum, Haeckel.
Triopyle trigona, Haeckel.
Discozonium trigonium, Haeckel.
Spongotripus ypsilon, Haeckel.
Stylotrochus geddesii, Haeckel.
Dictyocoryne profunda, Ehrenberg.
„ *tetradiscus*, Haeckel.
Spongaster quadratus, Haeckel.
Larcarium amphistylum, Haeckel.
Coccolarcus platellipsis, Haeckel.
Dizonium transversum, Haeckel.
Tetrapyle turrita, Haeckel.
Tetrapylonium pantellipticum, Haeckel.
Staurotholus octostylus, Haeckel.
Tholonium sphæronium, Haeckel.
Zonarium quadrispinum, Haeckel.
Larcospira quadrangula, Haeckel.
Tessaraspis concreta, Haeckel.
Archicircus princeps, Haeckel.
„ *monostephus*, Haeckel.
„ *primordialis*, Haeckel.
Dendrocircus elegans, Haeckel.
Cortina dendroides, Haeckel.
Clathrocircus multiforis, Haeckel.
Cortiniscus tripodiscus, Haeckel.
Stephaniscus tetrapodius, Haeckel.
Plectocoronis anacantha, Haeckel.
Podocoronis cortiniscus, Haeckel.
Tozarium circospyris, Haeckel.
Microculus dodecastoma, Haeckel.
Octotympanum arborescens, Haeckel.
Tricraspyris tripodiscus, Haeckel.
Cephalospyris triangulata, Haeckel.
Dorcalospyris dentata, Haeckel.
„ *antilope*, Haeckel.
Aegospyris aquispina, Haeckel.
Elaphospyris capricornis, Haeckel.
Gorgospyris medusetta, Haeckel.
Dictyospyris spinulosa, Ehrenberg.
„ *quadriloba*, Haeckel.
Tholospyris cupola, Haeckel.
Phormospyris tridentata, Haeckel.
Lamprospyris huxleyi, Haeckel.
Nephrospyris nephridium, Haeckel.
Botryopera cyrtoloba, Haeckel.
Cannobotrys sagittalis, Haeckel.
„ *cortina*, Haeckel.
Botryopyle dictyocephalus, Haeckel.
Acrobotrys disolenia, Haeckel.
Lithobotrys mascula, Haeckel.
Bothryocyrtis theocampe, Haeckel.
Tripodiscium ramosum, Haeckel
Euscenium plectaniscus, Haeckel
Cladoscenium ancoratum, Haecke.
Archiscenium quadrispinum, Haeckel.
Pteroscenium pinnatum, Haeckel.
Archipera multicornis, Haeckel.
Peripyramis spongiosa, Haeckel.
Phænoscenium polypodium, Haeckel.
Calpophæna hexacorethra, Haeckel.
Halicapsa hystrix, Haeckel.
Dictyophimus triserratus, Haeckel.
Lithomelissa bütschlii, Haeckel.
Psilomelissa calvata, Haeckel.
Clathrocanium reginæ, Haeckel.
Callimitra emmæ, Haeckel.
Clathrocorys giltschii, Haeckel.
Lychnodictyum wyvillei, Haeckel.
„ *scaphopodium*, Haeckel.
Sethophormis hexalactis, Haeckel.
„ *rotula*, Haeckel.
„ *aurelia*, Haeckel.
Sethamphora costata, Haeckel.
Acanthocorys hexapodia, Haeckel.
Anthocyrtium chrysanthemum, Haeckel.
„ *flosculus*, Haeckel.
Clistophæna pyramidalis, Haeckel.
„ *polyolena*, Haeckel.
Sethocyrtis oxycephalis, Haeckel.
Sethocorys patrocli, Haeckel.
Lophophæna liothorax, Haeckel.
Sethocapsa pyriformis, Haeckel.
Dictyoceras insectum, Haeckel.
Pteropilium eques, Haeckel.
Pterocanium orcinum, Haeckel.
Podocyrtis scaphopodia, Haeckel.
Theopera fusiformis, Haeckel.
Cycladophora pantheon, Haeckel.
Lamprocyclas reginæ, Haeckel.
Theocyrtis microtheca, Haeckel.
Tricolocampe cylindrica, Haeckel.
„ *urnula*, Haeckel.
„ *arcta*, Haeckel.
Theocampe sphærothorax, Haeckel.

Theocapsa mülleri, Haeckel.
„ *darwinii*, Haeckel.
Tricolocapsa dioscoridis, Haeckel.
Artopilium elegans, Haeckel.
Cyrtopera ornithoptera, Haeckel.
Litliostrobus hexastichus, Haeckel.
„ *macroceras*, Haeckel.
„ *seriatus*, Haeckel.
„ *quadratus*, Haeckel.
Artostrobus articulatus, Haeckel.
Lithomitra nodosaria, Haeckel.
Eucyrtidium teuscheri, Haeckel.
„ *stöhrii*, Haeckel.
Siphocampe annulosa, Haeckel.
Lithocampe octocola, Haeckel.
Spirocyrtis scalaris, Haeckel.
„ *merospira*, Haeckel.
Spirocyrtis diplospira, Haeckel.
Cyrtocapsa chrysalidium, Haeckel.
Artocapsa elegans, Haeckel.
Aulospathis variabilis, Haeckel.
Auloscena mirabilis, Haeckel.
Cannosphæra pacifica, Haeckel.
Challengeria bidens, Haeckel.
Challengeron monodon, Haeckel.
„ *crosbiei*, Haeckel.
„ *willemoesii*, Haeckel.
Cortinetta cortiniscus, Haeckel.
Haeckeliana murrayana, Haeckel.
Conchellium hippopus, Haeckel.
Conchidium terebratula, Haeckel.
Conchopsis lenticula, Haeckel.
Cœlodendrum serratum, Haeckel.
Cœlospathis octostyla, Haeckel.

STATION 274.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station :—

ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Actissa prunoides, Haeckel.
Collozoum stellatum, Haeckel.
Thalassoxanthium cervicorne, Haeckel.
„ *punctatum*, Haeckel.
Carposphæra capillacea, Haeckel.
Collosphæra primordialis, Haeckel.
Saturnalis annularis, Haeckel.
Hexacaryum arborescens, Haeckel.
Acanthosphæra insignis, Haeckel.
„ *marginata*, Haeckel.
„ *capillaris*, Haeckel.
„ *gibbosa*, Haeckel.
Coscinomma macrosiphon, Haeckel.
Cladococcus pinetum, Haeckel.
Haliomma favosum, Haeckel.
„ *datura*, Haeckel.
„ *wyrillei*, Haeckel.
Heliosoma radians, Haeckel.
Diplosphæra hexagonalis, Haeckel.
Drymosphæra hexagonalis, Haeckel.
Astrosphæra stellata, Haeckel.
Actinomma hexagonium, Haeckel.
„ *capillaceum*, Haeckel.
Cromyomma perspicuum, Haeckel.
Arachnopegma increscens, Haeckel.
Arachnosphæra dolichacantha, Haeckel.
Spongiomma denticulatum, Haeckel.
Spongechinus serrulatus, Haeckel.
Rhizoplegma polyacanthum, Haeckel.
Octodendron contortum, Haeckel.
Rhizosphæra serrata, Haeckel.
Cenellipsis faceta, Haeckel.
Druppatractus diodon, Haeckel.
Cypassis puella, Haeckel.
Sethodiscus phacoides, Haeckel.
Heliosestrum craspedotum, Haeckel.
Heliodiscus trochiscus, Haeckel.
Porodiscus perispira, Haeckel.
Rhopalastrum triceros, Haeckel.
Hymeniastrum euclidis, Haeckel.
„ *archimedis*, Haeckel.
Trigonastrum regulare, Haeckel.
Myelastrum farfalla, Haeckel.
„ *rotula*, Haeckel.
Pentalastrum ophidiaster, Haeckel.
Spongotrochus multispinus, Haeckel.
Rhopalodictyum elongatum, Haeckel.
Spongolarcus lentellipsis, Haeckel.
Larnacantha stauracantha, Haeckel.
Dizonium circulare, Haeckel.
Tetrapyle quadricornis, Haeckel.
Octopyle ovulina, Haeckel.
Pylonium quadricorne, Haeckel.
Lithelius capreolus, Haeckel.
Svironium spinosum, Haeckel.
Phorticium spironium, Haeckel.

STATION 274.

Spongophortis spongiosa, Haeckel.
Actinelius primordialis, Haeckel.
Litholophus ligurinus, Haeckel.
Acanthometron cylindricum, Haeckel.
,, *bulbiferum*, Haeckel.
Zygacantha costata, Haeckel.
Acanthonia denticulata, Haeckel.
,, *diplopyramis*, Haeckel.
Zygostaurus frontalis, Haeckel.
Amphilonche conica, Haeckel.
,, *acufera*, Haeckel.
Acantholonche amphipolaris, Haeckel.
,, *peripolaris*, Haeckel.
Pleuraspis amphithecta, Haeckel.
Dorataspis typica, Haeckel.
Orophaspis furcata, Haeckel.
Ceriaspis favosa, Haeckel.
Coscinaspis rhacopora, Haeckel (?).
Lychnaspis maxima, Haeckel.
Icosaspis cruciata, Haeckel.
Dorypelta furcata, Haeckel.
Thoracaspis bipennis, Haeckel.
Dictyaspis compacta, Haeckel.
Phatnaspis quadratura, Haeckel.
Hexalaspis heliodiscus, Haeckel.
Hexaconus vaginatus, Haeckel.
Diplocolpus serratus, Haeckel.
Plagiacantha dodecantha, Haeckel.
Polyplagia septenaria, Haeckel.
Plectaniscus cladoscenium, Haeckel.
Periplecta pteroscenium, Haeckel.
,, *monocyrtis*, Haeckel.
Dendrocircus arborescens, Haeckel.
Protympanium primordiale, Haeckel.
Petalospyris dictyocubus, Haeckel.
Anthospyris aculeata, Haeckel.
Litharachnium epeira, Haeckel.
Arachnocalpis ellipsoides, Haeckel.
Cornutella hexagona, Haeckel.
Cornutanna orthoconus, Haeckel.
Dictyophimus hertwigii, Haeckel.
Eucecryphalus halicalyptra, Haeckel.
Amphiplecta amphistoma, Haeckel.
Clathrolychnus araneosus, Haeckel.
Arachnocorys araneosa, Haeckel.
Carpocanium irregulare, Haeckel.
Sethoconus trochus, Haeckel.
,, *pileus*, Haeckel.
,, *facetus*, Haeckel.
Sethocyrtis pleuracantha, Haeckel.
Pterocorys campanula, Haeckel.
,, *rhinoceros*, Haeckel.
Theopilium tricostatum, Haeckel.
Theophormis cruciata, Haeckel.
Clathrocyclas jovis, Haeckel.
Cecryphalium sestrodiscus, Haeckel.
Phæocolla primordialis, Haeckel.
Cannobelos calymmata, Haeckel.
Mesocena octogona, Ehrenberg.
Aulacantha tubulosa, Haeckel.
Aulographis triglochin, Haeckel.
Sagena pertusa, Haeckel.
Sagoscena prætorium, Haeckel.
,, *debilis*, Haeckel.
Aularia ternaria, Haeckel.
Gazelletta macronema, Haeckel.
,, *orthonema*, Haeckel.
,, *robusta*, Haeckel.
Castanella campbelli, Haeckel.
Castanidium willemoesi, Haeckel.
,, *aldrichi*, Haeckel.

SIPHONOPHORÆ (Haeckel, Zool. pt. 77).

Diplophysa köllikeri, n.sp. (= eudoxia of *Sphæronectes köllikeri*, Huxley).

MACRURA (Spence Bate, Zool. pt. 52).

Sergestes oculatus, Krøyer.
,, *armatus*, Krøyer.

In addition, the following are recorded in the note-books :—*Pyrocystis*, *Peridinium tripos*, Diatoms attached to Copepods and free or entangled in the sarcode of *Pulvinulina*, as well as Coccospheres, Coccoliths, and other minute organisms, Gregarinæ in the intestines of *Sagittæ*, Amœba and zoospores, *Globigerina*, *Orbulina*, *Pullenia*, *Sphæroidina*, *Pulvinulina* (the last-mentioned being especially abundant, and most of the specimens had the sarcode expanded), Medusæ, *Sagitta*, *Tomopteris*, *Alciopa*, *Cypridina*,

Calanus, *Copilia*, *Saphirina*, Hyperids, *Euphausia*, *Lucifer*, Zoëæ, *Ethella* and other Gasteropods, *Atlanta*, Pteropods, *Salpa*, *Doliolum*, *Appendicularia*, small fishes and fish eggs. A tow-net sent down to 200 fathoms contained a few Challengeridæ, while one of the tow-nets at the weights brought up some deep-water Radiolarians and a red Crustacean (*Euphausia*). STATION 274.

September 13, 1875.

On this date the expedition had the misfortune to lose Dr. Rudolf von Willemoes-Suhm, one of the naturalists on the Civilian Scientific Staff, who died after a short illness from erysipelas. This sad circumstance cast a shade of melancholy over the ship, for Dr. von Willemoes-Suhm had won the respect of everyone on board, by his zealous attention to work, and by his readiness to put up with the many inconveniences inseparable from life on board ship, where the irksomeness of discipline can never be relaxed (for further particulars as to the career of Dr. von Willemoes-Suhm, see *Narr. Chall. Exp.*, vol. i. pp. 769–771).

Station 275 (Sounding 417), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19). STATION 275.

September 14, 1875; lat. 11° 20′ S., long. 150° 30′ W.
Temperature of air at noon, 81°·0; mean for the day, 79°·2.
Temperature of water :—

	°		°
Surface,	80·0	180 fathoms,	54·2
10 fathoms,	79·9	190 „	52·4
20 „	79·8	200 „	50·8
30 „	79·6	300 „	45·0
40 „	79·4	400 „	42·6
50 „	79·0	500 „	40·9
60 „	78·0	600 „	39·5
70 „	76·7	700 „	38·4
80 „	75·3	800 „	37·5
90 „	73·7	900 „	37·0
100 „	72·0	1000 „	36·7
110 „	70·1	1100 „	36·5
120 „	68·3	1200 „	36·2
130 „	66·2	1300 „	36·0
140 „	64·0	1400 „	35·8
150 „	61·4	1500 „	35·6
160 „	58·9	Bottom,	35·0
170 „	56·4		

Density at 60° F. at surface, 1·02678; 2125 fathoms, 1·02585; bottom, 1·02602.

Station 275

Depth, 2610 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 1.15 P.M. shortened and furled sails, and got up steam to sound. At 2 P.M. sounded in 2610 fathoms. The deposit was of a darker chocolate colour than any hitherto obtained, and contained a very large number of crystals of phillipsite formed *in situ* at the bottom. Obtained serial temperatures down to 1500 fathoms. At 5 P.M. completed observations and made all plain sail. Flocks of terns, man-of-war birds, and gannets were seen.

Distance at noon from Point Venus, Tahiti, 378 miles. Made good 70 miles. Amount of current 9 miles, direction S. 63° W.

Solenosphæra megalactis and *Challengeron willemoesii* were observed among the Radiolaria in the deposit from this Station.

Organisms from Surface Nets.

Surface Organisms.—The following species of Radiolaria are recorded from the surface at this Station:—

Radiolaria (Haeckel, Zool. pt. 40).
Hystrichaspis fruticata, Haeckel.
Zonaspis cingulata, Haeckel.
Sethoconus trochus, Haeckel.

In addition, the following are recorded in the note-books:—*Peridinium*, *Pyrocystis*, Diatoms, Coccospheres, Coccoliths, Amœba and small ciliated organisms, *Velella*, *Porpita*, *Physalia*, *Diphyes*, *Sagitta*, *Lepas* attached to a piece of wood, on which was also a small crab (*Nautilograpsus*), Phronimids, *Halobates*, large *Carinaria* without the head (several others were seen from the ship), cuttle-fish, *Appendicularia*, small Scopelids and other fishes. *Coryphæna* and flying fishes were observed.

Station 276.

Station 276 (Sounding 418), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19).

September 16, 1875; lat. 13° 28′ S., long. 149° 30′ W.
Temperature of air at noon, 73°·8; mean for the day, 76°·4.
Temperature of water:—

Surface,	80°·0	50 fathoms,	78°·4
10 fathoms,	78·9	60 ,,	78·2
20 ,,	78·8	70 ,,	77·7
30 ,,	78·7	80 ,,	76·4
40 ,,	78·6	90 ,,	75·1

100 fathoms,	73·7	500 fathoms,	40·3
110 „	72·2	600 „	39·1
120 „	70·6	700 „	38·3
130 „	68·8	800 „	37·8
140 „	67·0	900 „	37·3
150 „	65·1	1000 „	36·9
160 „	63·1	1100 „	36·6
170 „	61·0	1200 „	36·3
180 „	58·8	1300 „	36·0
190 „	56·6	1400 „	35·7
200 „	54·3	1500 „	35·4
300 „	44·8	Bottom,	35·1
400 „	41·9		

Density at 60° F. :—

Surface,	1·02628	300 fathoms,	1·02557
25 fathoms,	1·02669	400 „	1·02552
50 „	1·02678	800 „	1·02568
100 „	1·02689	Bottom,	1·02593
200 „	1·02574		

Depth, 2350 fathoms; deposit, Red Clay, containing 28·28 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. shortened and furled sails, proceeded under steam, and sounded in 2350 fathoms. The sounding-tube contained about a litre of the deposit; in the lower part of the tube it was of a dark red or chocolate colour, and contained many crystals of phillipsite, manganese grains, and volcanic minerals, but no carbonate of lime organisms and very few Radiolaria, in short was quite like the deposit at the previous Station. On this occasion the deposit was extracted from the tube in a long continuous roll, and a good idea could be formed of the arrangement of the deposit, which, proceeding upwards from the dark chocolate clay referred to, became lighter and lighter in colour, and *pari passu* with the lighter colour the calcareous organisms in the form of *Globigerina* and other Foraminifera increased in number till at the top of the tube there was a light grey coloured ooze containing over 30 per cent. of carbonate of lime; the transition from the Red Clay at the bottom to the calcareous ooze at the top was quite gradual. At 7.30 A.M. put trawl over and veered 2500 fathoms. Obtained serial temperatures down to 1500 fathoms. At 12.15 P.M. commenced heaving in trawl. Sent whaler away with naturalist for surface collecting. At 4.15 P.M. trawl came up with a large quantity of Red Clay, about half a ton of manganese nodules, small pieces of pumice, angular basaltic pebbles, many sharks' teeth, and a few animals. The tow-nets at the trawl were quite full of the deposit, in the siftings of which were found many

Station 276.

Globigerinæ, *Pulvinulinæ*, a few *Biloculinæ*, small sharks' teeth, and a few Echini spines. Proceeded under steam.

Point Venus, Tahiti, distant at noon, 241 miles. Made good 90 miles. Amount of current 3 miles, direction E.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Ophiuroidea (Lyman, Zool. pt. 14).

Ophiochytra epigrus, n.g., n.sp. One specimen ; obtained at no other locality. Only species of the genus.

Ostracoda (Brady, Zool. pt. 3).

Cythere circumdentata, n.sp. Obtained also at Station 246.

Macrura (Spence Bate, Zool. pt. 52).

Aristeus armatus, n.sp. One specimen ; obtained also at Stations 133, 184, 213, 237, 246, and 323.

Benthesicymus crenatus, n.g., n.sp. Two specimens ; obtained also at Station 272.

Fishes (Günther, Zool. pt. 57).

Malacosarcus macrostoma, n.g., n.sp. One specimen ; obtained also at Station 271. Only species of the genus.

The Station-book records also *Stephanoscyphus* on the manganese nodules.

Excluding Protozoa, about 10 specimens of invertebrates and fishes were obtained at this Station, belonging to 6 species, of which 5 are new to science, including representatives of 3 new genera ; 1 new genus and new species was not obtained elsewhere.

Organisms from the Deposit.

Foraminifera (Brady, Zool. pt. 22).—The following species of Foraminifera were observed in the deposit from this Station ; the pelagic species, which make up about 88 per cent. of the carbonate of lime present in the deposit, are marked thus × :—

Biloculina bulloides, d'Orbigny.
„ *depressa*, d'Orbigny.
„ „ var. *murrhyna*, Schwager.
„ „ var. *serrata*, Brady.
Miliolina oblonga (Montagu).
„ *seminulum* (Linné).
„ *venusta* (Karrer).
Spiroloculina crenata, Karrer (?).
Pelosina cylindrica, Brady (?).
Technitella legumen, Norman.
Hyperammina ramosa, Brady (?).
Aschemonella catenata (Norman).
Rhizammina algæformis, Brady.
Reophax adunca, Brady.

Reophax dentaliniformis, Brady.
„ *difflugiformis*, Brady.
„ *guttifera*, Brady.
„ *spiculifera*, Brady.
Haplophragmium globigeriniforme (Parker and Jones).
„ *latidorsatum* (Bornemann).
Thurammina papillata, Brady.
Ammodiscus gordialis (Jones and Parker).
„ *proteus* (Karrer).
„ *tenuis*, Brady.
Trochammina galeata, Brady.
„ *lituiformis*, Brady.
„ *pauciloculata*, Brady.
„ *proteus*, Brady.
„ *trullissata*, Brady.
Textularia agglutinans, d'Orbigny
Verneuilina pygmæa (Egger).
Tritaxia lepida, Brady (?).
Gaudryina pupoides, d'Orbigny.
„ „ var. *chilostoma*, Reuss.
Bulimina buchiana, d'Orbigny.
Virgulina schreibersiana, Czjzek.
Cassidulina subglobosa, Brady.
Ehrenbergina hystrix, Brady.
„ *serrata*, Reuss.
Lagena acuta (Reuss).
„ *acuticosta*, Reuss.
„ *alveolata*, Brady, var. *substriata*, Brady.
„ *apiculata*, Reuss.
„ *auriculata*, Brady.
„ „ var. *costata*, Brady.
„ *desmophora*, Rymer Jones.
„ *exsculpta*, Brady.
„ *feildeniana*, Brady.
„ *fimbriata*, Brady.
„ *formosa*, Schwager.
„ *globosa* (Montagu).
„ *gracilis*, Williamson.
„ *gracillima* (Seguenza).
„ *hexagona* (Williamson).
„ *interrupta* (Williamson).
„ *lævigata* (Reuss).
„ *lævis* (Montagu).
„ *lagenoides* (Williamson), var. *tenuistriata*, Brady.
„ *longispina*, Brady.
„ *marginata* (Walker and Boys).
„ *orbignyana* (Seguenza).
„ *plumigera*, Brady.

Lagena quinquelatera, Brady. STATION 276.
„ *seminiformis*, Schwager.
„ *semistriata*, Williamson.
„ *stelligera*, Brady.
„ *striata* (d'Orbigny).
„ *sulcata* (Walker and Jacob).
„ *torquata*, Brady.
„ sp. (?).
Nodosaria communis, d'Orbigny.
„ *inflexa*, Reuss (?).
„ *mucronata*, Neugeboren.
Vaginulina sp. (?).
Cristellaria acutauricularis (Fichtel and Moll).
Polymorphina angusta, Egger.
„ *lactea* (Walker and Jacob).
„ *lanceolata*, Reuss.
„ *longicollis*, Brady.
„ *rotundata*, Bornemann.
„ *seguenzana*, Brady (?).
„ *sororia*, Reuss.
„ sp. (?).
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *digitata*, Brady.
× „ *dubia*, Egger.
× „ *helicina*, d'Orbigny.
× „ *inflata*, d'Orbigny.
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Pullenia obliquiloculata*, Parker and Jones.
„ *quinqueloba*, Reuss.
„ *sphæroides* (d'Orbigny).
× *Sphæroidina dehiscens*, Parker and Jones.
Truncatulina humilis, Brady.
„ *lobatula* (Walker and Jacob).
„ *pygmæa*, Hantken.
„ *tenera*, Brady.
× *Pulvinulina crassa*, d'Orbigny.
„ *exigua*, Brady.
„ *favus*, Brady.
„ *karsteni* (Reuss) (?).
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
× „ *tumida*, Brady.
„ *umbonata*, Reuss.
Rotalia beccarii (Linné).
„ *orbicularis*, d'Orbigny.
Nonionina pompilioides (Fichtel and Moll).
„ *umbilicatula* (Montagu).

Station 276. Organisms from Surface Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).
Drymosphæra cladophora, Haeckel.
Hystrichaspis furcata, Haeckel.
Sethoconus trochus, Haeckel.

Cirripedia (Hoek, Zool. pt. 25).
Lepas anserifera, Linné.

Heteropoda (Smith, Zool. pt. 72).
Carinaria cristata (Linné).

Cephalopoda (Hoyle, Zool. pt. 44).
Tremoctopus quoyanus (d'Orbigny), Steenstrup.

Fishes (Günther, Zool. pt. 78).
Coryphæna hippurus, (young).
Nomeus gronovii, Gm.
Auchenoceros sp. (?), (young).

In addition, the following are recorded in the note-books :—*Peridinium tripos* and three other species, *Pyrocystis*, *Ethmodiscus* and other Diatoms, *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina*, Amœba and Infusorians, Medusæ, *Porpita*, *Physalia*, Ctenophoræ, *Sagitta*, *Alciopa*, *Tomopteris*, Aphroditacean larvæ, *Evadne*, Calanids, *Setella*, *Saphirina*, and other Copepods, Hyperids, Stomatopod larvæ, *Euphausia*, *Lucifer*, *Halobates*, *Ianthina* (adult and young), young of other Gasteropods, *Atlanta*, *Tiedemannia* [= *Gleba*], *Diacria* [= *Cavolinia*], *Styliola*, *Spirialis*, [= *Limacina*], *Salpa*, *Appendicularia*, *Doliolum*. Several sharks were seen about the ship.

Mr. Murray went away in a boat and picked up a good many *Ianthinæ*, on which *Lepas* was growing, and on the *Lepas* were *Acineta* and small Aphroditaceans. He also took specimens of *Porpita* and *Physalia ;* under the latter he observed two species of small blue fishes, one with stripes of blue and white, and they were generally taken in the net along with *Physalia*. Some smaller fishes were seen, and many specimens of *Collosphæra* were floating on the surface. *Halobates* was abundant. Some pieces of wood were noticed on the surface, and the presence of *Evadne*, Annelid larvæ, the numerous *Peridinia* and Infusoria, appeared to indicate some drift from land.

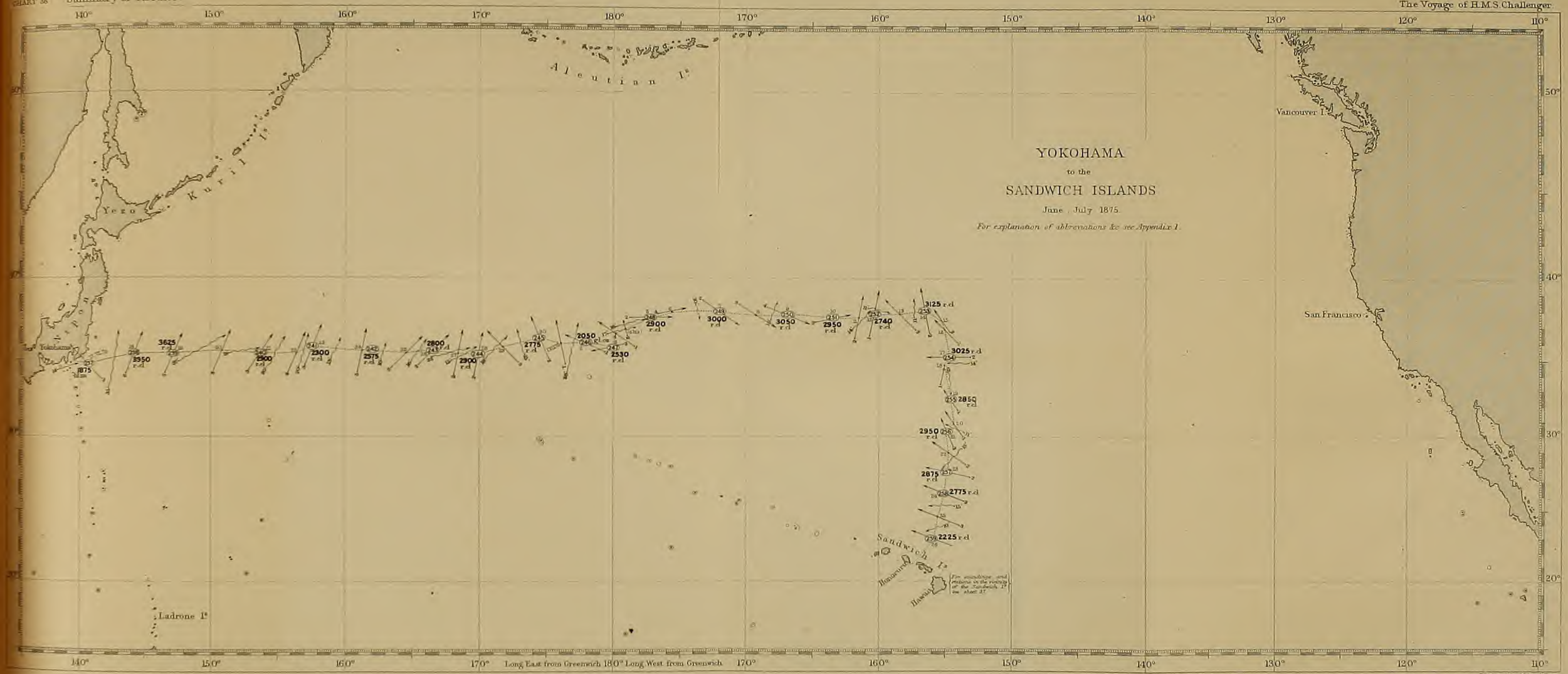
Station 277.

Station 277 (Sounding 419), Sandwich Islands to Tahiti (see Chart 38 and Diagram 16).

September 17, 1875 ; lat. 15° 51′ S., long. 149° 41′ W.
Temperature of air at noon, 78°·8 ; mean for the day, 76°·7.

YOKOHAMA
to the
SANDWICH ISLANDS
June, July 1875.

For explanation of abbreviations &c see Appendix I.



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BRITISH MUSEUM
NATURAL HISTORY

Temperature of water :— STATION 277.

Surface,	79·0°	110 fathoms,	71·2°
10 fathoms,	78·5	120 „	70·2
20 „	78·0	130 „	69·0
30 „	77·5	140 „	68·8
40 „	77·0	150 „	66·4
50 „	76·4	160 „	64·8
60 „	75·8	170 „	63·0
70 „	74·7	180 „	61·2
80 „	74·0	190 „	59·3
90 „	73·1	200 „	57·4
100 „	72·2	Bottom,	35·1

Density at 60° F. at 1850 fathoms, 1·02580 ; bottom, 1·02581.

Depth, 2325 fathoms ; deposit, Red Clay, containing 9·43 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.15 P.M. stopped and sounded in 2325 fathoms. The deposit in the lower part of the tube was of a chocolate colour, and contained only traces of carbonate of lime, while in the upper part it was of a light grey colour, the transition between the two being gradual, as at the previous Station. At 4.30 P.M. took serial temperatures down to 200 fathoms. At 7.30 P.M. proceeded under steam. A gannet was seen in the evening, but birds were on the whole rare.

Distance at noon from Point Venus, Tahiti, 123 miles ; from Tetuaroa Islands, 96 miles. Made good 120 miles. Amount of current 12 miles, direction S. 62° W.

Surface Organisms.—A short haul of the tow-net gave many small Lamellibranch shells, Annelid larvæ, and other things. Several sharks were seen about the ship. ORGANISMS FROM SURFACE-NETS.

Station 278 (Sounding 420), Sandwich Islands to Tahiti (see Chart 38 and Diagram 19). STATION 278.

September 18, 1875 ; lat. 17° 12′ S., long. 149° 43′ W.

Temperature of air at noon, 80°·8 ; mean for the day, 77°·0.

Temperature of water :—

Surface,	79·5°	60 fathoms,	76·7°
10 fathoms,	78·0	70 „	75·2
20 „	77·3	80 „	73·5
30 „	77·0	90 „	72·2
40 „	77·0	100 „	71·2
50 „	77·0	110 „	70·5

Station 278.

120 fathoms,	70·0°	300 fathoms,	46·2°
130 „	69·5	400 „	42·6
140 „	68·5	500 „	40·0
150 „	67·7	600 „	38·7
160 „	66·7	700 „	37·7
170 „	65·3	800 „	37·1
180 „	63·8	900 „	36·8
190 „	61·6	1000 „	36·5
200 „	59·2	Bottom,	36·5

Density at 60° F. :—

Surface,	1·02696	200 fathoms,	1·02593
25 fathoms,	1·02694	400 „	1·02548
50 „	1·02697	1025 „	1·02556
100 „	1·02678	Bottom,	1·02565

Depth, 1525 fathoms; deposit, Volcanic Mud, containing 20·47 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5 A.M. observed Tahiti and Eimeo Islands ahead, and at 5.50 A.M. Tetuaroa Islands on the port bow. At 10 A.M. stopped and sounded in 1525 fathoms. Obtained serial temperatures down to 1000 fathoms. At 12.40 P.M. completed observations and proceeded towards Papieté Harbour, anchoring there in 11 fathoms at 4.20 P. M.

Stations 279 to 279c.

Stations 279 to 279c (Soundings 421 to 424), off Tahiti (see Chart 39).

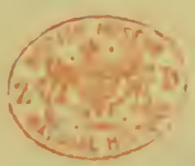
October 2, 1875.

Temperature of air at noon, 80°·3; mean for the day, 77°·0.

Temperature of water :—

Surface,	79·0°	175 fathoms,	61·0°
25 fathoms,	76·2	200 „	55·3
50 „	76·2	225 „	51·6
75 „	74·4	250 „	48·8
100 „	72·4	275 „	46·0
125 „	69·8	300 „	44·3
150 „	66·3		

At 11 A.M. got up steam, and at 12.15 A.M. weighed anchor and proceeded out of Papieté Harbour with a numerous party of visitors on board. Sounded successively outside Papieté Harbour in 420 fathoms, deposit Volcanic Mud, containing 22·30 per cent. of carbonate of lime (Station 279); in 590 fathoms, deposit Volcanic Mud, containing 25·28 per cent. of carbonate of lime (Station 279A); in 620 fathoms, deposit



Volcanic Mud, containing 22·66 per cent. of carbonate of lime (Station 279B); and in 680 fathoms, deposit Volcanic Mud, containing 19·47 per cent. of carbonate of lime (Station 279C). At 3 P.M. lowered trawl in 680 fathoms, but it came up at 4.30 P.M. empty, except for a small shrimp attached to the netting. Obtained serial temperatures down to 300 fathoms. At 5.50 P.M. anchored again in Papieté Harbour. STATIONS 279 TO 279C.

The following species of Ostracoda and Foraminifera are recorded from the deposit at Station 279, 420 fathoms :— ORGANISMS FROM THE DEPOSIT.

OSTRACODA (Brady, Zool. pt. 3).

Paracypris polita, Sars (?).
Pontocypris (?) sp.
Bairdia foveolata, Brady.
Cythere fortificata, n.sp.
„ *lactea*, Brady.
Cytheridea spinulosa, Brady.

FORAMINIFERA (Brady, Zool. pt. 22).—The pelagic species, which make up about 31 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Nubecularia inflata, Brady.
Biloculina ringens (Lamarck).
Spiroloculina excavata, d'Orbigny.
„ *fragilissima*, Brady.
„ *grata*, Terquem.
„ *nitida*, d'Orbigny.
Miliolina alveoliniformis, Brady.
„ *insignis*, Brady.
„ *oblonga* (Montagu).
„ *parkeri*, Brady.
„ *pygmæa* (Reuss).
„ *tricarinata* (d'Orbigny).
„ *trigonula* (Lamarck).
Articulina conico-articulata (Batsch).
Vertebralina striata, d'Orbigny.
Ophthalmidium inconstans, Brady
Hauerina ornatissima (Karrer).
Cornuspira involvens, Reuss.
Textularia agglutinans, d'Orbigny.
„ *conica*, d'Orbigny.
„ *quadrilatera*, Schwager.
Gaudryina filiformis, Berthelin.
„ *pupoides*, d'Orbigny.
„ „ var. *chilostoma*, Reuss.
Bulimina inflata, Seguenza.
„ *marginata*, d'Orbigny.
„ *pyrula*, d'Orbigny.
Virgulina schreibersiana, Czjzek.
„ *squamosa*, d'Orbigny.
„ *subsquamosa*, Egger.
Bolivina hantkeniana, Brady.
„ *karreriana*, Brady.
„ *nobilis*, Hantken.
„ *porrecta*, Brady.
„ *punctata*, d'Orbigny.
„ *reticulata*, Hantken.
Cassidulina crassa, d'Orbigny.
„ *lævigata*, d'Orbigny.
Chilostomella ovoidea, Reuss.
Lagena gracillima (Seguenza).
Nodosaria communis, d'Orbigny.
„ *pyrula*, d'Orbigny.
„ *subcanaliculata* (Neugeboren).
Cristellaria convergens, Bornemann.
„ *crepidula* (Fichtel and Moll).
„ *orbicularis*, d'Orbigny.
„ *vortex* (Fichtel and Moll).
Uvigerina asperula, Czjzek, var. *ampullacea*, Brady.
Sagrina columellaris, Brady.
„ *dimorpha*, Parker and Jones.
„ *raphanus*, Parker and Jones.
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× *Hastigerina pelagica* (d'Orbigny).
Sphæroidina bulloides, d'Orbigny.
× „ *dehiscens*, Parker and Jones.
Patellina corrugata, Williamson.
Cymbalopora poeyi (d'Orbigny).
Discorbina concinna, Brady.
„ *rosacea* (d'Orbigny).

Station 279.

Discorbina saulcii (d'Orbigny).
Truncatulina haidingerii (d'Orbigny).
,, *lobatula* (Walker and Jacob).
,, *ungeriana* (d'Orbigny).
Pulvinulina auricula (Fichtel and Moll).
,, *elegans* (d'Orbigny).
Pulvinulina hauerii (d'Orbigny).
Rotalia orbicularis, d'Orbigny.
,, *soldanii*, d'Orbigny.
Amphistegina lessonii, d'Orbigny.
Operculina complanata (Defrance).
Heterostegina depressa, d'Orbigny.

At Tahiti

The Challenger remained at Tahiti from 4.20 P.M. on September 18 till 9 A.M. on October 3 (for description of the island see *Narr. Chall. Exp.*, vol. i. pp. 776–788). Mr. Murray and Lieutenant Swire spent most of the time in examining the outward slope of the reef, by dredging, sounding, &c., from the steam pinnace and boats. The following species are recorded in the Zoological Reports as having been obtained from shore and shallow-water during the stay :—

Animals from Tahiti

Keratosa (Poléjaeff, Zool. pt. 31).

Luffaria variabilis, n.sp. Obtained also at New Hebrides.

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Halichondria solida, n.sp. One specimen (30 to 70 fathoms); obtained also at New Hebrides (var.).

Acarnus ternatus, Ridley. One specimen (20 fathoms); obtained at no other locality by the Challenger. Recorded from Bombay, Torres Strait, and Amirante Islands.

Echinodictyum asperum, n.sp. Eight specimens (20 fathoms); obtained at no other locality.

Tetractinellida (Sollas, Zool. pt. 63).

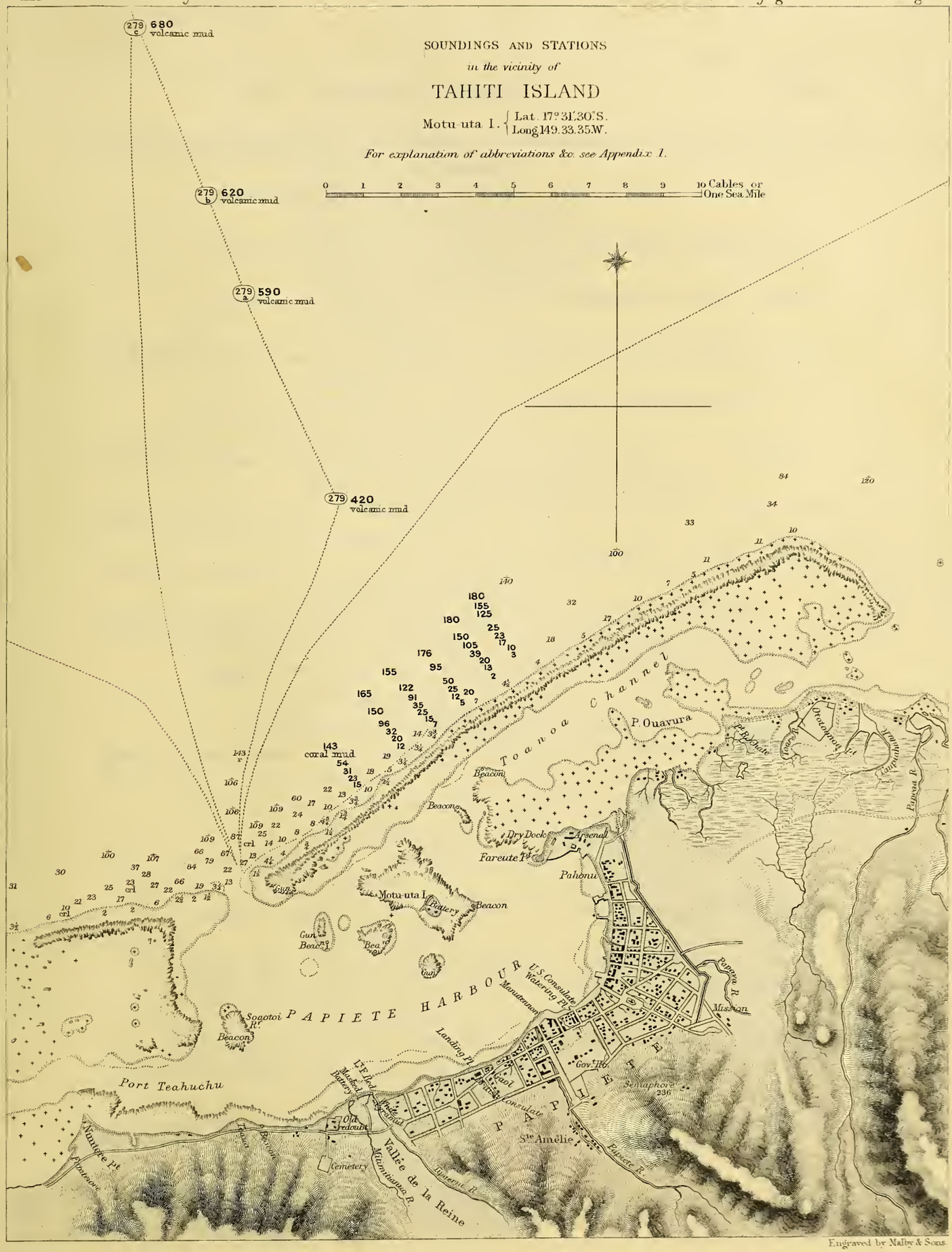
Pilochrota pachydermata, n.g., n.sp. One specimen (30 to 70 fathoms); obtained at no other locality.

Alcyonaria (Wright and Studer, Zool. pt. 64).

Spongodes carnea, n.sp. (30 to 70 fathoms); obtained at no other locality.
,, *pustulosa*, n.sp. Three specimens (30 to 70 fathoms); obtained at no other locality.
,, *cervicornis*, n.sp. (30 to 70 fathoms); obtained at no other locality.

Reef Corals (Quelch, Zool. pt. 46).

Pocillopora cespitosa, Dana. One specimen; obtained also at Sandwich Islands.
,, *solida*, n.sp. One specimen; obtained at no other locality.
,, *grandis*, Dana. One specimen; obtained at no other locality by the Challenger.



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Leptastræa solida (M.-Edwards and Haime). One specimen; obtained at no other locality by the Challenger. TAHITI.

„ *ehrenbergana*, M.-Edwards and Haime. One specimen; obtained at no other locality by the Challenger.

„ *roissyana*, M.-Edwards and Haime. Two specimens; obtained at no other locality by the Challenger.

„ *transversa*, Klunzinger. One specimen; obtained at no other locality by the Challenger.

Pavonia formosa, Dana. Two specimens; obtained at no other locality by the Challenger.

„ *prætorta*, Dana. Several specimens; obtained at no other locality by the Challenger.

Trochoseris stokesi, M.-Edwards and Haime. One specimen (30 to 70 fathoms); obtained at no other locality by the Challenger.

Pachyseris speciosa (Dana). Two specimens; obtained at no other locality by the Challenger.

Cylloseris incrustans, n.g., n.sp. Two specimens; obtained at no other locality. Only species of the genus.

Domoseris porosa, n.g., n.sp. Three specimens; obtained at no other locality.

„ *solida*, n.g., n.sp. One specimen; obtained at no other locality.

„ *regularis*, n.g., n.sp. Two specimens (30 to 70 fathoms); obtained at no other locality.

The genus *Domoseris* was not obtained elsewhere.

Fungia discus, Dana. Many specimens; obtained at no other locality by the Challenger.

„ *concinna*, Verrill. Two specimens; obtained at no other locality by the Challenger.

„ *horrida*, Dana. Two specimens; obtained at no other locality by the Challenger.

„ *acutidens*, Studer. Three specimens; obtained at no other locality by the Challenger.

„ *rugosa*, n.sp. Two specimens; obtained at no other locality.

„ *scutaria*, Lamarck. Many specimens; obtained at no other locality by the Challenger.

„ *paumotensis*, Stutchbury. Many specimens; obtained also at Philippines.

Sandalolitha dentata, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Madrepora danæ, Verrill. Two specimens; obtained at no other locality by the Challenger.

Tahiti. *Madrepora plantaginea*, Lamarck. One specimen; obtained at no other locality by the Challenger.

,, *retusa*, Dana. One specimen; obtained at no other locality by the Challenger.

,, *nasuta*, Dana. Two specimens; obtained at no other locality by the Challenger.

,, *paxilligera*, Dana. One specimen; obtained at no other locality by the Challenger.

,, *virgata*, Dana. Several specimens; obtained at no other locality by the Challenger.

,, *parilis*, n.sp. (?). Obtained also at Philippines.

,, *speciosa*, n.sp. Several specimens; obtained at no other locality.

,, *cytherea*, Dana. Several specimens; obtained at no other locality by the Challenger.

,, *surculosa*, Dana. Several specimens; obtained at no other locality by the Challenger.

Montipora papillosa (Lamarck). One specimen; obtained at no other locality by the Challenger.

,, *aspera*, Verrill. Obtained at no other locality by the Challenger.

Porites arenosa (Esper). Obtained also at Tongatabu, Fiji, and Banda.

,, *latistellata*, n.sp. One specimen; obtained at no other locality.

Napopora irregularis, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Synaræa convexa, Verrill. Several specimens; obtained at no other locality by the Challenger.

Millepora nodosa, Esper. Several specimens; obtained at no other locality by the Challenger.

,, *gonagra*, M.-Edwards and Haime. One specimen; obtained also at Fiji and Philippines.

Echinoidea (Agassiz, Zool. pt. 9).

Diadema setosum, Gray. Obtained also at Cape Verdes, St. Thomas, and Philippines.

Echinothrix calamaris (Pallas). Obtained also at Fiji and Philippines.

Echinometra lucunter (Leske). For distribution see Tongatabu.

Peronella decagonalis (Lesson). (20 fathoms); for distribution see Station 173.

Rhinobrissus hemiasteroides, n.sp. (20 fathoms); obtained at no other locality.

Holothurioidea (Théel, Zool. pt. 39).

Synapta beselii, Jæger. Numerous specimens; for distribution see Station 177.

MACRURA (Spence Bate, Zool. pt. 52). TAHITI.

Panulirus penicillatus (Olivier). One specimen (Papieté market); obtained at no other locality by the Challenger. Recorded from Indian Ocean, Fiji, and New Hebrides.

Bithynis lar (Fabricius). Five specimens (river at Papeuriri); for distribution see Fiji.

ANOMURA (Henderson, Zool. pt. 69).

Cœnobita rugosa, M.-Edwards. Several specimens; for distribution see Fiji.

Pagurus deformis, M.-Edwards. One specimen; obtained at no other locality by the Challenger. Recorded from Indo-Pacific region.

Calcinus tibicen (Herbst). One specimen; obtained at no other locality by the Challenger. Recorded from Indo-Pacific region.

BRACHYURA (Miers, Zool. pt. 49).

Scylla serrata (Forskål). Two specimens (Papieté); obtained at no other locality by the Challenger. Recorded from Indo-Pacific region.

Cardiosoma carnifex (Herbst). Eight specimens (Papieté and Tahiti); obtained also at Fiji and Admiralty Islands.

Gelasimus tetragonon (Herbst). Five specimens (shore, river mouths, and near reefs); obtained also at Arrou Islands.

Metopograpsus messor (Forskål), var. *frontalis*, nov. Many specimens (brackish water and near reefs); obtained also at Fiji and Sandwich Islands.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Cytherea (*Dione*) *philippinarum*, Hanley. (20 fathoms); obtained also at Fiji and Banda.

Lima tahitensis, n.sp. (30 to 40 fathoms); obtained at no other locality.

GASTEROPODA (Watson, Zool. pt. 42).

Scissurella coronata, n.sp. (20 fathoms); obtained at no other locality.

„ sp. (?). (20 fathoms).

Cyclostrema sp. (?). (20 fathoms).

Turbo petholatus, Linné. (20 fathoms); obtained at no other locality by the Challenger. Recorded from Indian and Pacific Oceans. Fossil—Post-Pliocene, Red Sea.

Cypræa teres, Gmelin. Obtained at no other locality by the Challenger. Original locality unknown.

Tahiti.

Cæcum sepimentum, De Folin, var. *arcuata*, nov. Two specimens (20 fathoms); the species obtained also at Station 172 and Sandwich Islands.

,, sp. (?). (20 fathoms).

Odostomia (*Parthemia*) sp. (?). (20 fathoms).

,, sp. (?). (20 fathoms).

Cerithiopsis, n.sp. (?). (20 fathoms).

Cerithium sp. (?). (20 fathoms).

Alaba (*Stiliferina*) *striata*, n.sp. (20 fathoms); obtained also at Fiji.

,, sp. (?). (20 fathoms).

Rissoa, two species undetermined. (20 fathoms).

Utriculus (*Tornatina*) sp. (?). (20 fathoms); obtained also at Sandwich Islands.

Cylichna tahitiensis, n.sp. (20 fathoms); obtained at no other locality.

,, , three other species undetermined. (20 fathoms).

Tunicata (Herdman, Zool. pts. 17 and 38).

Cynthia papietensis, n.sp. Ten specimens (10 and 20 fathoms); obtained at no other locality.

Fishes (Günther, Zool. pt. 6).

Dules marginatus, C.V. (Papeuriri); obtained also at Fiji and Sandwich Islands.

Caranx hippos, Linné. (Brackish water near Papieté); obtained also at Sandwich Islands.

Acanthurus (?) sp., young (*Acronurus*). (Brackish water near Papieté).

Eleotris fusca, Bl. Schn. (Streams and brackish water near Papieté); obtained also at Fiji and Sandwich Islands.

Gomphosus tricolor, Quoy and Gaimard. Obtained at no other locality by the Challenger.

Anguilla aneitensis, Günther. (Lake Waihirra and river near); obtained at no other locality by the Challenger.

,, *mauritiana*, Benn. (Lake Waihirra); obtained at no other locality by the Challenger.

Muræna nebulosa, Ahl. Obtained at no other locality by the Challenger.

,, *richardsoni*, Bleeker. Obtained at no other locality by the Challenger.

Diodon hystrix, Linné. Obtained at no other locality by the Challenger.

In the foregoing list 97 species are enumerated, of which 27 are new to science, including representatives of 5 new genera; 20 of the new species and 4 new genera were not obtained elsewhere.

Surface Organisms.—The following species are recorded from the surface in the neighbourhood of Tahiti :— Tahiti. Organisms from Surface-Nets.

Siphonophoræ (Haeckel, Zool. pt. 77).
Diphyopsis angustata (Eschscholtz).

Amphipoda (Stebbing, Zool. pt. 67).
Cyclocaris tahitensis, n.g., n.sp.

Macrura (Spence Bate, Zool. pt. 52).
Lucifer reynaudii, M.-Edwards.

Tunicata (Herdman, Zool. pt. 76).
Appendicularia sp. (?).

The tow-nets inside the reefs at Tahiti generally gave a few ordinary oceanic forms, along with many larval Ascidians, Zoëæ, &c., and life generally was much less abundant than in the tow-nettings on the outside of the reefs.

Station 280 (Sounding 425), Tahiti to Valparaiso (see Chart 38 and Diagram 19). Station 280.

October 4, 1875 ; lat. 18° 40′ S., long. 149° 52′ W.
Temperature of air at noon, 76°·8 ; mean for the day, 75°·5.
Temperature of water :—

Surface,	77°·2	400 fathoms,	41°·7
25 fathoms,	76·9	500 „	40·2
50 „	76·2	600 „	38·8
75 „	75·0	700 „	37·9
100 „	73·0	800 „	37·2
125 „	70·0	900 „	36·8
150 „	66·4	1000 „	36·4
175 „	62·5	1100 „	36·2
200 „	58·0	1200 „	36·1
225 „	52·8	1300 „	36·0
250 „	48·1	1400 „	35·9
275 „	46·1	1500 „	35·8
300 „	44·9	Bottom,	35·3

Density at 60° F. :—

Surface,	1·02707	300 fathoms,	1·02554
25 fathoms,	1·02701	400 „	1·02548
50 „	1·02674	1550 „	1·02567
100 „	1·02686	Bottom,	1·02630
200 „	1·02612		

Depth, 1940 fathoms; deposit, Globigerina Ooze, containing 53·36 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Station 280.

At 5 A.M. shortened and furled sails, and got up steam to sound and trawl. At 6 A.M. sounded in 2050 fathoms, only a small quantity of the deposit being obtained adhering to the sounding-tube. At 8 A.M. put trawl over. At 10 A.M. sounded in 1940 fathoms. The sounding-tube contained a piece of wood perforated by worms. Obtained serial temperatures down to 1500 fathoms. At 3 P.M. trawl came up containing only two or three specimens, while the tow-net attached brought up some fragments of volcanic rock and two or three manganese nodules. The trawl was used without a bag. At 3.10 P.M. made sail. A black albatross was seen about the ship on the afternoon of October 5.

Tubuai Island distant at noon, 284 miles. Made good 63 miles. Amount of current 13 miles, direction S. 73° W.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Ostracoda (Brady, Zool. pt. 3).

Cythere dictyon, n.sp. For distribution see Station 24.

Polyzoa (Busk, Zool. pt. 30).

Catenaria bicornis, n.sp. Obtained at no other locality.

The Station-book records also an Esperid.

Organisms from the Deposit.

Foraminifera (Brady, Zool. pt. 22).—The following species of Foraminifera were observed in the deposit from this Station ; the pelagic species, which make up about 84 per cent. of the carbonate of lime present in the deposit, are marked thus × :—

Biloculina depressa, d'Orbigny.
Miliolina seminulum (Linné).
„ *venusta* (Karrer).
Haplophragmium latidorsatum (Bornemann).
Hormosina carpenteri, Brady.
Trochammina trullissata, Brady.
Verneuilina pygmæa (Egger).
Gaudryina pupoides, d'Orbigny.
Cassidulina crassa, d'Orbigny.
Ehrenbergina hystrix, Brady.
Lagena formosa, Schwager.
„ *marginata* (Walker and Boys).
Uvigerina asperula, Czjzek.
„ *pygmæa*, d'Orbigny.
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *succulifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Pullenia obliquiloculata*, Parker and Jones.
„ *sphæroides* (d'Orbigny).
× *Sphæroidina dehiscens*, Parker and Jones.
× *Candeina nitida*, d'Orbigny.
Truncatulina pygmæa, Hantken.
„ *ungeriana* (d'Orbigny).
„ *wuellerstorfi* (Schwager).
× *Pulvinulina crassa* (d'Orbigny).
„ *favus*, Brady.
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
„ *partschiana* (d'Orbigny).
× „ *patagonica* (d'Orbigny).
× „ *tumida*, Brady.
„ *umbonata*, Reuss.
Rotalia soldanii, d'Orbigny.
Nonionina pompilioides (Fichtel and Moll).
„ *umbilicatula* (Montagu).

Surface Organisms.—The following species is recorded from the surface at this Station :— STATION 280. ORGANISMS FROM SURFACE-NETS.

PTEROPODA (Pelseneer, Zool. pt. 65).

Cuvierina columnella (Rang).

In addition, the following are recorded in the note-books :—*Peridinium*, *Ethmodiscus* and other Diatoms, *Hastigerina*, Acanthometræ and other Radiolaria, Siphonophoræ, Echinoderm larvæ, *Sagitta*, *Evadne*, *Cypridina*, *Copilia*, *Saphirina*, and other Copepods, *Euphausia*, *Sergestes*, *Lucifer*, *Atlanta*, *Salpa*, *Appendicularia*, small Scopelids. In the stomachs of the *Salpæ* were many Rhabdospheres and Coccospheres. In the tow-nets at the weights and trawl were found a very small Sipunculid (?), a few small red Crustaceans, and one or two small Scopelids. Several dolphins (*Coryphæna*) were seen.

Station 281 (Sounding 426), Tahiti to Valparaiso (see Chart 38 and Diagram 19). STATION 281.

October 6, 1875 ; lat. 22° 21′ S., long. 150° 17′ W.
Temperature of air at noon, 75°·3 ; mean for the day, 74°·0.
Temperature of water :—

Surface,	74·5	400 fathoms,	42·3
25 fathoms,	74·3	500 „	40·5
50 „	73·5	600 „	39·3
75 „	72·1	700 „	38·4
100 „	68·9	800 „	37·5
125 „	65·7	900 „	37·0
150 „	62·5	1000 „	36·5
175 „	59·3	1100 „	36·2
200 „	56·2	1200 „	36·0
225 „	53·1	1300 „	35·8
250 „	50·0	1400 „	35·6
275 „	47·4	1500 „	35·5
300 „	45·6	Bottom,	34·9

Density at 60° F. :—

Surface,	1·02670	300 fathoms,	1·02558
25 fathoms,	1·02665	400 „	1·02547
50 „	1·02667	800 „	1·02564
100 „	1·02645	1900 „	1·02561
200 „	1·02600	Bottom,	1·02628

Station 281. Depth, 2385 fathoms; deposit, Red Clay, with very many crystals of phillipsite formed *in situ* at the bottom, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5 A.M. shortened and furled sail, and proceeded under steam to sound. At 5.40 A.M. sounded in 2385 fathoms; the sounding-tube brought up no trace of the bottom. Put over trawl and veered 2900 fathoms. At 10 A.M. obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 200 fathoms, and amounted to 43·2 milligrammes per litre. At 1 P.M. commenced heaving in trawl, which came up at 3.30 P.M. with several specimens. The bag contained about two gallons of Red Clay, between two and three bushels of manganese nodules, slabs of volcanic tufa covered with manganese, over a hundred sharks' teeth, and six tympanic and three petrous bones of Cetaceans. The enamel of one of the *Carcharodon* teeth was over four inches in length along the edge, and was as large as, if not larger than, any of the specimens of *Carcharodon megalodon* procured in Tertiary deposits from different parts of the world. Made sail.

Distance at noon from Tubuai Island, 75 miles; from Rurutu Island, 61 miles. Made good 82 miles. Amount of current 24 miles, direction S. 23° W.

Animals from Trawl. The following species are recorded in the Zoological Reports from the trawl at this Station :—

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Esperella biserialis, n.sp. One specimen; obtained also at Station 291, 2250 fathoms.

Cladorhiza abyssicola, Sars, var. *linearis*, nov. Three specimens; obtained also at Station 274 (var. *rectangularis*).

,, *similis*, n.sp. One specimen; obtained at no other locality.

Axinella profunda, n.sp. One specimen; obtained also at Station 241.

Hexactinellida (Schulze, Zool. pt. 53).

Dictyocalyx gracilis, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Dictyoninæ. One specimen.

Holothurioidea (Théel, Zool. pt. 13).

Oneirophanta mutabilis, n.g., n.sp. Obtained also at Stations 146, 157, 160, 241, 244, 299, and 325. Only species of the genus.

Isopoda (Beddard, Zool. pt. 48).

Arcturus abyssicola, n.sp. One specimen; obtained also at Station 184 (?).

MACRURA (Spence Bate, Zool. pt. 52). STATION 281.

Haliporus curvirostris, n.g., n.sp. One specimen; obtained also at Station 285, 2375 fathoms.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Sarepta abyssicola, n.sp. One specimen; obtained also at Station 246.

FISHES (Günther, Zool. pt. 57).

Bathysaurus mollis, n.g., n.sp. One specimen; obtained also at Station 237.

In addition to the foregoing, a small Sponge attached to manganese slab and a Polyzoon (*Bicellaria*) are recorded in the Station-book.

Excluding Protozoa, about 20 specimens of invertebrates and fishes were obtained at this Station, belonging to 13 species, of which 10 (all those described) are new to science, including representatives of 4 new genera; 2 new species and 1 new genus were not obtained elsewhere.

Station 282 (Sounding 427), Tahiti to Valparaiso (see Chart 38 and Diagram 19). STATION 282.

October 7, 1875; lat. 23° 46′ S., long. 149° 59′ W.

Temperature of air at noon, 70°·8; mean for the day, 71°·2.

Temperature of water:—

Surface,	73°·2	400 fathoms,	43°·2
25 fathoms,	72·0	500 „	41·2
50 „	71·0	600 „	39·6
75 „	69·8	700 „	38·3
100 „	68·1	800 „	37·3
125 „	66·5	900 „	36·7
150 „	64·3	1000 „	36·3
175 „	61·5	1100 „	36·0
200 „	58·3	1200 „	36·0
225 „	54·7	1300 „	35·6
250 „	50·8	1400 „	35·4
275 „	48·3	1500 „	35·2
300 „	46·2	Bottom,	35·1

Density at 60° F. at surface, 1·02676; 2000 fathoms, 1·02549; bottom, 1·02582.

Depth, 2450 fathoms; deposit, Red Clay, with very many crystals of phillipsite formed *in situ* at the bottom, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Station 282. At 7 A.M. observed Tubuai Island lying nearly due east, at a distance of 30 miles. At 1.30 P.M. shortened and furled sails, and proceeded under steam to sound. At 2 P.M. sounded in 2450 fathoms. Obtained serial temperatures down to 1500 fathoms. At 5 P.M. completed observations, and at 5.30 P.M. made sail.

Valparaiso distant at noon, 4167 miles. Made good 81 miles. Amount of current 7 miles, direction S.

Organisms from Surface-Nets. Surface Organisms.—The following species are recorded from the surface in the neighbourhood of this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Dicranastrum dichotomum, Haeckel.
Sethoconus trochus, Haeckel.
Stichopterium virgineum, Haeckel.

Pelagic Hemiptera (White, Zool. pt. 19).

Halobates sericeus, Eschscholtz.

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Hyalocylix*) *striata* (Rang).

In addition, the following are recorded in the note-books :—*Ceratium* (*Peridinium*) *tripos*, Coccospheres, Rhabdospheres, *Globigerina*, *Hastigerina*, Infusoria, Siphonophoræ, *Sagitta*, *Alciopa*, Annelid larvæ, *Cypridina*, *Corycæus*, *Copilia*, *Saphirina*, and other Copepods, Stomatopod larvæ, small shells (*Ianthina* ?), *Salpa*, *Appendicularia*, and small fishes.

Station 283. **Station 283** (Sounding 428), Tahiti to Valparaiso (see Chart 38 and Diagram 19).

October 9, 1875 ; lat. 26° 9′ S., long. 145° 17′ W.
Temperature of air at noon, 68°·3 ; mean for the day, 66°·0.
Temperature of water :—

Surface,	68·5	400 fathoms,	42·2
25 fathoms,	68·2	500 „	40·3
50 „	68·0	600 „	39·0
75 „	66·5	700 „	38·0
100 „	64·6	800 „	37·3
125 „	62·8	900 „	36·7
150 „	60·3	1000 „	36·3
175 „	57·5	1100 „	36·0
200 „	54·8	1200 „	35·8
225 „	52·0	1300 „	35·6
250 „	49·2	1400 „	35·4
275 „	46·8	1500 „	35·4
300 „	45·4	Bottom,	35·4

Density at 60° F. :— Station 283.

Surface,	1·02633	200 fathoms,	1·02595
25 fathoms,	1·02632	300 „	1·02561
50 „	1·02617	400 „	1·02538
75 „	1·02617	Bottom,	1·02583
100 „	1·02617		

Depth, 2075 fathoms; deposit, Globigerina Ooze, containing 46·61 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 8 A.M. got up steam. At 9 A.M. shortened and furled sails. At 10 A.M. sounded in 2075 fathoms. Nearly a foot of the deposit came up in the tube, the upper surface being a light yellow Globigerina Ooze; passing down the tube the ooze became gradually darker, till at the bottom there was a dark chocolate coloured clay containing rounded pellets of manganese and many yellow crystals of phillipsite. Obtained serial temperatures down to 1500 fathoms. At 12.55 P.M. completed observations and made sail. A large albatross (*Diomedea exulans*), large black or brown petrels, another petrel of a lighter colour, and five or six apparently land-birds, like plovers, were seen.

Distance at noon from Valparaiso, 3854 miles; from Oparo Island, 101 miles; from Lancaster or Neilson Reef, about 70 miles. Made good 161 miles. Amount of current 23 miles, direction N. 41° E.

Surface Organisms.—The following are recorded in the note-books from the surface at this Station :—*Peridinium*, *Pyrocystis*, *Ethmodiscus* and other Diatoms, Coccospheres, Rhabdospheres, *Globigerina*, Acanthometræ, Polycystinæ, and other Radiolaria, Infusoria, Siphonophoræ, *Sagitta*, *Alciopa*, *Tomopteris*, *Cypridina*, *Copilia*, *Saphirina*, and other Copepods, *Evadne*, *Euphausia*, *Lucifer*, small Lamellibranch shells, *Salpa*, *Appendicularia*. Organisms from Surface-Nets.

Station 284 (Sounding 429), Tahiti to Valparaiso (see Chart 38 and Diagram 19). Station 284.

October 11, 1875; lat. 28° 22′ S., long. 141° 22′ W.

Temperature of air at noon, 67°·8; mean for the day, 66°·5.

Temperature of water :—

	°		°
Surface,	68·0	150 fathoms,	59·0
25 fathoms,	67·4	175 „	56·8
50 „	66·6	200 „	54·6
75 „	65·0	225 „	52·5
100 „	63·2	250 „	50·2
125 „	61·0	275 „	48·1

Station 284.

300 fathoms,	45·8	1000 fathoms,	36·4
400 „	41·6	1100 „	36·0
500 „	40·0	1200 „	35·8
600 „	39·0	1300 „	35·7
700 „	38·2	1400 „	35·6
800 „	37·4	1500 „	35·4
900 „	36·9	Bottom,	35·1

Density at 60° F. :—

Surface,	1·02631	300 fathoms,	1·02551
25 fathoms,	1·02625	400 „	1·02546
50 „	1·02628	500 „	1·02564
100 „	1·02623	1975 „	1·02576
200 „	1·02601	Bottom,	1·02615

Depth, 1985 fathoms; deposit, Globigerina Ooze, containing 65·81 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4 A.M. shortened and furled sails, and proceeded under steam. At 6 A.M. sounded in 1985 fathoms. Put over trawl and veered 2500 fathoms. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 200, 800, and 1975 fathoms, and amounted respectively to 35·8, 46·2, and 51·2 milligrammes per litre. At 1 P.M. commenced heaving in trawl, but at 2.30 P.M. the trawl-rope carried away, and the trawl with its contents, apparently heavy, and 2000 fathoms of line, were lost. Made all plain sail and proceeded. One or two large albatrosses (*Diomedea exulans*) were seen.

Valparaiso distant at noon, 3608 miles; Bass Islands about 120 miles. Made good 87 miles. Amount of current 13 miles, direction N.

Organisms from the Deposit.

Foraminifera (Brady, Zool. pt. 22).—The following species of Foraminifera were observed during the examination of the deposit from this Station; the pelagic species, which make up about 76 per cent. of the carbonate of lime present in the deposit, are marked thus × :—

Biloculina depressa, d'Orbigny.
„ „ var. *murrhyna*, Schwager.
„ *elongata*, d'Orbigny.
Spiroloculina acutimargo, Brady.
„ *tenuis* (Czjzek).
Miliolina venusta (Karrer).
„ sp. (?).
Hyperammina vagans, Brady.
Reophax adunca, Brady.
Reophax dentaliniformis, Brady.
„ *difflugiformis*, Brady.
„ *guttifera*, Brady.
„ *scorpiurus*, Montfort.
„ sp. (?).
Haplophragmium canariense (d'Orbigny).
„ *foliaceum*, Brady.
„ *latidorsatum* (Bornemann).
Hormosina globulifera, Brady.

Ammodiscus incertus (d'Orbigny).
Trochammina galeata, Brady.
,, *pauciloculata*, Brady.
,, *ringens*, Brady.
,, *trullissata*, Brady.
Verneuilina pygmæa (Egger).
,, sp. (?).
Gaudryina pupoides, d'Orbigny.
,, ,, var. *chilostoma*, Reuss.
,, *siphonella*, Reuss.
Bulimina elegans, d'Orbigny, var. *exilis*, Brady (?).
Virgulina schreibersiana, Czjzek.
Cassidulina crassa, d'Orbigny.
,, *subglobosa*, Brady.
Ehrenbergina hystrix, Brady.
,, *serrata*, Reuss.
Lagena alveolata, Brady, var. *substriata*, Brady (?).
,, *apiculata*, Reuss.
,, *formosa*, Schwager.
,, *globosa* (Montagu).
,, *gracilis*, Williamson.
,, *gracillima* (Seguenza).
,, *lævis* (Montagu).
,, *lagenoides* (Williamson), var. *tenuistriata*, Brady.
,, *longispina*, Brady.
,, *marginata* (Walker and Boys).
,, ,, var. *semimarginata*, Reuss.
,, *quadricostulata*, Reuss.
,, *seminiformis*, Schwager.
,, *striata* (d'Orbigny).
,, *unguiculata*, Brady (?).
,, sp. (?).
Nodosaria (*Glandulina*) *æqualis*, Reuss (?). STATION 284.
,, *communis*, d'Orbigny.
,, *vertebralis* (Batsch) (?).
,, sp. (?).
Polymorphina sp. (?).
Uvigerina asperula, Czjzek.
,, ,, var. *ampullacea*, Brady.
× *Globigerina æquilateralis*, Brady.
× ,, *bulloides*, d'Orbigny.
× ,, *conglobata*, Brady.
× ,, *digitata*, Brady.
× ,, *helicina*, d'Orbigny.
× ,, *inflata*, d'Orbigny.
× ,, *rubra*, d'Orbigny.
× ,, *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Hastigerina pelagica* (d'Orbigny).
× *Pullenia obliquiloculata*, Parker and Jones.
,, *quinqueloba*, Reuss.
,, *sphæroides* (d'Orbigny).
× *Sphæroidina dehiscens*, Parker and Jones.
× *Candeina nitida*, d'Orbigny.
Truncatulina dutemplei (d'Orbigny).
,, *lobatula* (Walker and Jacob).
,, *pygmæa*, Hantken.
,, *tenera*, Brady.
,, *wuellerstorfi* (Schwager).
× *Pulvinulina canariensis* (d'Orbigny).
× ,, *crassa* (d'Orbigny).
,, *exigua*, Brady.
,, *favus*, Brady.
× ,, *micheliniana* (d'Orbigny).
Nonionina pompilioides (Fichtel and Moll).

Surface Organisms.—The following species of Radiolaria are recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).
Rhizoplegma lychnosphæra, Haeckel.
Ellipsidium opuntia, Haeckel.
Amphirrhopalum bigeminum, Haeckel.
Dorypelta tetrodon, Haeckel.
Hexalaspis stellata, Haeckel.
Dictyophimus bütschlii, Haeckel.
Polypetta alveolata, Haeckel.

In addition, the following are recorded in the note-books (October 11 to 13) :— *Peridinium* (several kinds), *Pyrocystis*, *Ethmodiscus* and other Diatoms, Coccospheres, Rhabdospheres, *Globigerina*, *Hastigerina*, Infusoria, Siphonophoræ, Echinoderm larvæ, *Sagitta*, *Alciopa*, *Evadne*, *Cypridina*, *Saphirina* and other Copepods, Hyperids,

Station 284. Phronimids, Stomatopod larvæ, *Euphausia*, many Pteropods, *Salpa*, *Appendicularia*, and many small fishes.

Station 285

Station 285 (Sounding 430), Tahiti to Valparaiso (see Chart 38 and Diagram 19).

October 14, 1875; lat. 32° 36′ S., long. 137° 43′ W.
Temperature of air at noon, 62°·8; mean for the day, 62°·2.
Temperature of water:—

	°		°
Surface,	65·0	400 fathoms,	42·8
25 fathoms,	63·8	500 „	41·0
50 „	63·4	600 „	39·5
75 „	63·0	700 „	38·4
100 „	61·8	800 „	37·7
125 „	60·0	900 „	37·0
150 „	57·5	1000 „	36·6
175 „	55·0	1100 „	36·3
200 „	52·3	1200 „	36·1
225 „	49·8	1300 „	35·9
250 „	46·8	1400 „	35·8
275 „	46·2	1500 „	35·7
300 „	45·2	Bottom,	35·0

Density at 60° F.:—

Surface,	1·02621	300 fathoms,	1·02550
25 fathoms,	1·02600	400 „	1·02556
50 „	1·02609	800 „	1·02553
100 „	1·02600	Bottom,	1·02575
200 „	1·02581		

Depth, 2375 fathoms; deposit, Red Clay, containing 26·25 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.15 A.M. shortened and furled sails, and at 5 A.M. proceeded under steam. At 5.30 A.M. sounded in 2375 fathoms. At 7 A.M. put trawl over and veered 2900 fathoms. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in bottom water, and amounted to 45·6 milligrammes per litre. At 1 P.M. commenced heaving in trawl, which came up at 3.45 P.M. with several specimens, several quarts of dark chocolate-coloured clay, and large numbers of manganese nodules, sharks' teeth, carbones and fragments of other bones of Cetaceans, pumice-stones, and angular and rounded pebbles, apparently ice-borne. The specimen of the deposit procured in the sounding-tube

contained carbonate of lime in the upper layers in the form of pelagic Foraminifera, but that in the trawl did not show any effervescence when treated with dilute acid. Station 285.

There were between two and three bushels of manganese nodules. The great majority of these were of small size, from 1 to 2·5 cm. in diameter, resembling a lot of marbles. One large nodule, however, with a large white-coloured nucleus, appeared to have been broken to pieces in the trawl. The white nucleus had at one time been a portion of a deep-sea deposit, but not like the dark-coloured clay that came up in the trawl, for it contained numerous casts of *Globigerina* shells, along with many angular fragments of basic volcanic glass. The inner concentric layers of the great majority of the nodules formed light brown coloured nuclei, which have frequently been compared to coprolites by geologists who have examined them. These lighter layers are less than 1 mm. in diameter, and are arranged concentrically around altered pieces of volcanic glass, sharks' teeth or their fragments. The outer layers are of a darker colour, and contain much more manganese than the inner ones. The typical nodules contain about 37 per cent. of manganese peroxide and 24 per cent. of ferric oxide. The structure of bone can be readily recognised in some of the nodules, while others appear to have been formed upon fragments of bone, though now all traces of the bone have disappeared.

Altogether about fifty petrous and tympanic bones of Cetaceans were procured, belonging to the genera *Balænoptera*, *Mesoplodon*, *Delphinus*, *Globiocephalus*, and Baleen whales. Many of these were deeply imbedded in concentric layers of manganese, while in other cases large portions of the bone had been removed and substituted by depositions of manganese.

More than fifteen hundred sharks' teeth and fragments, over 1 cm. in length, were present, belonging to the genera *Carcharodon*, *Oxyrhina*, *Lamna*, *Corax* or *Galeus* or *Hemipristis*, while immense numbers of smaller teeth and fragments were found in the deposit or in the nodules. Some of the larger teeth were surrounded with layers of manganese, but, as a rule, they were not so deeply imbedded as the smaller teeth and fragments. The internal portions of the teeth were generally filled with deposits of manganese; the vaso-dentine and osteo-dentine had been entirely removed, the hard external enamel-like dentine alone remaining.

The nuclei of the nodules were occasionally pieces of volcanic rock; most of these had undergone considerable alteration, the glassy base having been converted into palagonite. Many of the specimens showed agate-like bands. These palagonitic layers were soft and could be cut with a knife like cheese when taken from the sea, but they have since become quite brittle. Among the nodules were several bomb-like fragments, about 1 cm. in diameter, with a hard thin exterior, and a hollow interior partly filled with ferruginous matters. Some of the nodules contained hollow spaces, in which the manganese assumed a radiate, crypto-crystalline, structure. The outsides of the nodules were generally covered with Rhizopod tubes, or the stolons of Hydroids, and these

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could sometimes be observed in the body of the nodules, incorporated between the successive layers.

There were six rounded or rolled pebbles; the largest, having in one direction a diameter of over 3 cm., was a basaltic rock, while the others were fragments of granitic and gneissic rocks. These pebbles are believed to have been ice-borne, this Station being just beyond the borders of the region of floating ice in the southern hemisphere. Twelve rounded pieces of pumice, the largest about the size of a hen's egg, were also met with; the outer portions were decomposed into earthy matter, and covered with layers of manganese, which also penetrated in the form of dendrites throughout the whole of the mass. Numerous magnetic spherules were extracted from the deposit at this Station, as well as from the manganese nodules.

At 4 P.M. made sail. Several albatrosses and one or two Cape pigeons were seen.

Valparaiso distant at noon, 3324 miles. Made good 144 miles. Amount of current 10 miles, direction S. 44° E.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station:—

Corals (Moseley, Zool. pt. 7).

Deltocyathus italicus, M.-Edwards and Haime. One specimen; for distribution see Station 24.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha minuta, n.sp. (?). Two specimens; obtained also at Stations 146 and 158.

Annelida (M'Intosh, Zool. pt. 34).

Placostegus ornatus, Sowerby. Obtained also at Stations 244 and 253.

,, *mörchii*, n.sp. One specimen; obtained at no other locality.

Macrura (Spence Bate, Zool. pt. 52).

Haliporus curvirostris, n.g., n.sp. One specimen; obtained also at Station 281.

Benthesicymus brasiliensis, n.g., n.sp. One specimen; obtained also at Stations 168, 173, 181, 184, and 323.

Acanthephyra longidens, n.sp. One specimen; obtained also at Station 198.

Anomura (Henderson, Zool. pt. 69).

Tylaspis anomala, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

On the nodules were Rhizopod and *Serpula* tubes, and a flask-shaped structure, about half a centimetre in diameter, which appeared to be the egg-capsule of some Mollusc. STATION 285.

Excluding Protozoa, about 20 specimens of invertebrates were obtained at this Station, belonging to about 11 species, of which 6 are new to science, including representatives of 3 new genera; 2 of the new species and 1 new genus were not obtained elsewhere.

The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :— ORGANISMS FROM THE DEPOSIT.

FORAMINIFERA (Brady, Zool. pt. 22).—The single pelagic species (*Globigerina bulloides*) makes up about 76 per cent. of the carbonate of lime present in the deposit.

Psammosphæra fusca, Schulze.
Hyperammina ramosa, Brady.
Reophax scorpiurus (Montfort).
Haplophragmium glomeratum, Brady.
„ *latidorsatum* (Bornemann).
Trochammina trullissata, Brady.
Verneuilina pygmæa (Egger).
Spiroplecta biformis (Parker and Jones).
Gaudryina pupoides, d'Orbigny.
Bulimina buchiana, d'Orbigny.
Lagena acuta (Reuss).
× *Globigerina bulloides*, d'Orbigny.
Truncatulina pygmæa, Hantken.
Nonionina pompilioides (Fichtel and Moll).

RADIOLARIA (Haeckel, Zool. pt. 40).

Solenosphæra megalactis, Haeckel.
Stylosphæra urania, Haeckel.
Amphistylus glyptodon, Haeckel.
Spongostylus serratus, Haeckel.
Staurosphæra bartholomæi, Haeckel.
Heliosphæra cristata, Haeckel.
Cromyatractus ceparius, Haeckel.
Cyphanta colpodes, Haeckel.
Cyphonium mammarium, Haeckel.
Trochodiscus cingillum, Haeckel.
Sethodiscus cristatus, Haeckel.
Tessarastrum brunonis, Haeckel.
Streblacantha calcarina, Haeckel.
Hexaplecta triaxonia, Haeckel.
Tiarospyris amphora, Haeckel.
Amphispyris subquadrata, Haeckel.
Acrobotrys aquaria, Haeckel.
Sethopyramis trapezoides, Haeckel.
Stichocorys huschkei, Haeckel.
Artocapsa octocamera, Haeckel.
Aulographis tetrancistra, Haeckel.
Circoporus characeus, Haeckel.
Cœlodendrum lappaceum, Haeckel.

Surface Organisms.—The following species are recorded from the deep tow-nets at this Station :— ORGANISMS FROM SURFACE-NETS.

SCHIZOPODA (Sars, Zool. pt. 37).

Thysanopoda obtusifrons, n.sp.

MACRURA (Spence Bate, Zool. pt. 52).

Bentheocaris exuens, n.g., n.sp.

In addition, the following are recorded in the note-books from the surface :— *Pyrocystis*, *Ethmodiscus* and other Diatoms, *Globigerina*, many Radiolaria of all the divisions, Siphonophoræ, *Tomopteris*, Sipunculid larvæ, Planarian larvæ, *Evadne*, *Cypridina*, Copepods, small Lamellibranchs, and Pteropods.

Station 286. **Station 286** (Sounding 431), Tahiti to Valparaiso (see Chart 38 and Diagram 19).

October 16, 1875 ; lat. 33° 29′ S., long. 133° 22′ W.
Temperature of air at noon, 61°·8 ; mean for the day, 60°·0.
Temperature of water :—

	°		°
Surface, ...	63·0	400 fathoms, . . .	42·4
25 fathoms, . . .	62·6	500 „ . . .	41·0
50 „ . . .	59·4	600 „ . . .	40·0
75 „ . . .	59·4	700 „ . . .	39·0
100 „ . . .	59·4	800 „ . . .	38·2
125 „ . . .	57·3	900 „ . . .	37·7
150 „ . . .	54·3	1000 „ . . .	37·1
175 „ . . .	51·3	1100 „ . . .	36·5
200 „ . . .	49·0	1200 „ . . .	36·2
225 „ . . .	47·5	1300 „ . . .	36·0
250 „ . . .	46·2	1400 „ . . .	35·9
275 „ . . .	45·3	1500 „ . . .	35·8
300 „ . . .	44·5	Bottom, . . .	34·8

Density at 60° F.:—

Surface, ...	1·02608	300 fathoms, . . .	1·02545
25 fathoms, . . .	1·02602	400 „ . . .	1·02548
50 „ . . .	1·02603	800 „ . . .	1·02536
100 „ . . .	1·02599	2290 „ . . .	1·02570
200 „ . . .	1·02563	Bottom, . . .	1·02570

Depth, 2335 fathoms ; deposit, Red Clay, containing 25·13 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Under steam all night. At 5.10 A.M. stopped, and at 5.30 A.M. sounded in 2335 fathoms. Two layers were to be observed in the contents of the sounding-tube ; the upper two inches were very dark red and contained very little carbonate of lime, the lower four or five inches light yellow, smooth, firm, containing a considerable quantity of carbonate of lime, and with much less manganese than in the upper layer, this being the reverse order in which the layers have been noticed at the last few Stations. At 8 A.M. put trawl over and veered 2800 fathoms. Sent whaler away with naturalist for surface collecting. Obtained serial temperatures down to 1500 fathoms. At 1 P.M. commenced heaving in trawl, which came up with several specimens, about two bushels of manganese nodules and pumice-stones, over three hundred sharks' teeth and fragments, and about ninety tympanic bullæ and forty-two detached petrous bones, beaks of Ziphioid whales, fragments of flat and spongy bones, and numerous other small fragments forming nuclei of the manganese nodules, a large granitic pebble, apparently ice-borne, and numbers of

clayey concretions of a greyish colour. Proceeded under steam. Albatrosses (*Diomedea exulans* and another species), Cape pigeons, black petrels, and lighter coloured petrels were seen. STATION 286.

Valparaiso distant at noon, 3106 miles. Made good 84 miles. Amount of current 2 miles, direction N. 57° E.

The following species are recorded in the Zoological Reports from the trawl at this Station :— ANIMALS FROM TRAWL.

HEXACTINELLIDA (Schulze, Zool. pt. 53).

Bathydorus baculifer, n.g., n.sp. One specimen ; obtained at no other locality.
Dictyonine. One specimen.

ACTINIARIA (Hertwig, Zool. pt. 73).

Phellia (?) sp. One specimen.

ASTEROIDEA (Sladen, Zool. pt. 51).

Porcellanaster crassus, n.g., n.sp. Obtained at no other locality.
Marsipaster spinosissimus, n.g., n.sp. Obtained at no other locality.
Hymenaster echinulatus, n.sp. Obtained at no other locality.
,, *geometricus*, n.sp. Obtained at no other locality.

FISHES (Günther, Zool. pt. 57).

Gonostoma microdon, n.sp. One specimen ; for distribution see Station 23.

In addition, the Station-book records :—Another Actinian, *Serpula*, and two specimens of *Stephanoscyphus* on the nodules, as well as Rhizopods.

Excluding Protozoa, over a dozen specimens of invertebrates and fishes were obtained at this Station, belonging to about 11 species, of which 6 (all those described) are new to science, including representatives of 3 new genera ; 5 of the new species were not obtained elsewhere.

FORAMINIFERA (Brady, Zool. pt. 22).—The following species of Foraminifera were observed in the deposit from this Station ; the pelagic species, which make up about 60 per cent. of the carbonate of lime present in the deposit, are marked thus × :— ORGANISMS FROM THE DEPOSIT.

Biloculina depressa, d'Orbigny.
,, ,, var. *murrhyna*, Schwager.
Psammosphæra fusca, Schulze.
Hyperammina elongata, Brady.
Hyperammina ramosa, Brady.
,, *vagans*, Brady.
Aschemonella catenata (Norman).
Reophax dentaliniformis, Brady.

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Reophax difflugiformis, Brady.
„ *distans*, Brady.
„ *guttifera*, Brady.
„ *scorpiurus*, Montfort.
„ *spiculifera*, Brady (?).
Haplophragmium canariense (d'Orbigny).
„ *globigeriniforme* (Parker and Jones).
„ *latidorsatum* (Bornemann).
Thurammina papillata, Brady.
Ammodiscus gordialis (Parker and Jones).
„ *incertus* (d'Orbigny).
Trochammina lituiformis, Brady.
„ *trullissata*, Brady.
Textularia agglutinans, d'Orbigny.
Verneuilina pygmæa (Egger).
Gaudryina pupoides, d'Orbigny.
Virgulina schreibersiana, Czjzek.
Pleurostomella subnodosa, Reuss.
Cassidulina subglobosa, Brady.
Ehrenbergina hystrix, Brady.
Lagena acuta (Reuss).
„ *apiculata*, Reuss.
„ *formosa*, Schwager.
„ *globosa* (Montagu).
„ *lævigata* (Reuss).
Lagena lævis (Montagu).
„ *longispina*, Brady.
„ *marginata* (Walker and Boys).
„ *orbignyana* (Seguenza).
„ *semistriata*, Williamson.
„ *sulcata* (Walker and Jacob).
„ *variata*, Brady (?).
Nodosaria communis, d'Orbigny.
„ *perversa*, Schwager.
„ sp. (?).
Urigerina asperula, Czjzek.
× *Globigerina bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *pachyderma* (Ehrenberg).
× „ *rubra*, d'Orbigny.
× *Orbulina universa*, d'Orbigny.
Pullenia quinqueloba, Reuss.
Truncatulina lobatula (Walker and Jacob)
„ *pygmæa*, Hantken.
× *Pulvinulina crassa* (d'Orbigny).
„ *exigua*, Brady.
„ *karsteni* (Reuss).
× „ *micheliniana* (d'Orbigny).
Rotalia beccarii (Linné).
„ *soldanii*, d'Orbigny.
Nonionina umbilicatula (Montagu).

Organisms from Surface-Nets.

Surface Organisms.—The following are recorded in the note-books from the surface tow-nets (October 16 to 18):—*Pyrocystis*, Diatoms, Coccospheres, Rhabdospheres, *Globigerina*, *Orbulina*, Medusæ, Siphonophoræ, *Cypridina*, Copepods, *Mysis*, Zoëæ, small shells, Pteropods, *Appendicularia*, *Doliolum*, *Salpa*. Mr. Murray went away in a boat and picked up some *Physaliæ*, while a few Radiolaria and Copepods were seen with the water-glass.

Station 287.

Station 287 (Sounding 432), Tahiti to Valparaiso (see Chart 38 and Diagram 19).

October 19, 1875; lat. 36° 32′ S., long. 132° 52′ W.
Temperature of air at noon, 58°·8; mean for the day, 56°·0.
Temperature of water:—

Surface,	57°·8	100 fathoms,	55°·3
25 fathoms,	57·4	125 „	52·8
50 „	55·8	150 „	49·5
75 „	55·6	175 „	47·3

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	°		°
200 fathoms, . . .	46·1	800 fathoms, . . .	38·0
225 „ . . .	45·4	900 „ . . .	37·2
250 „ . . .	44·7	1000 „ . . .	36·6
275 „ . . .	44·1	1100 „ . . .	36·1
300 „ . . .	43·7	1200 „ . . .	35·8
400 „ . . .	42·1	1300 „ . . .	35·7
500 „ . . .	40·9	1400 „ . . .	35·6
600 „ . . .	39·7	1500 „ . . .	35·5
700 „ . . .	38·9	Bottom, . . .	34·7

Density at 60° F. :—

Surface, . . .	1·02586	200 fathoms, .	1·02544
25 fathoms, . .	1·02560	400 „ . .	1·02541
50 „ . . .	1·02560	1925 „ . .	1·02548
100 „ . . .	1·02559	Bottom, . .	1·02564

Depth, 2400 fathoms; deposit, Red Clay, containing 1·00 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4 A.M. shortened and furled sails, and proceeded under steam to sound. At 5.30 A.M. sounded in 2400 fathoms. The deposit contained a large quantity of manganese and numerous crystals of phillipsite, and fragments of fishes' teeth. Obtained serial temperatures down to 1500 fathoms. At 10.20 A.M. completed observations, and at 10.25 A.M. made all plain sail. *Diomedea exulans*, molly-mauks (*Diomedea melanophrys* ?), Cape pigeons (*Procellaria capensis*), mutton birds, *Prion vittatus*, and a *Thalassidroma* were seen.

Valparaiso distant at noon, 3018 miles. Made good 49 miles. Amount of current 14 miles, direction S. 74° W.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station :— Organisms from Surface-Nets.

Ostracoda (Brady, Zool. pt. 3).

Halocypris atlantica, Lubbock.
„ *brevirostris*, Dana.

Copepoda (Brady, Zool. pt. 23).

Calanus finmarchicus (Günner).
„ *valgus*, n.sp.
Pleuromma abdominale (Lubbock).
Undina darwinii (Lubbock).
Euchæta hessei, n.sp.
Centropages violaceus (Claus).
Corycæus varius, Dana.
Saphirina ovalis, Dana.

Amphipoda (Stebbing, Zool. pt. 67).

Primno macropa, Guérin.
Leptocotis ambobus, n.sp.

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Schizopoda (Sars, Zool. pt. 37).
Siriella thompsoni (M.-Edwards).

Tunicata (Herdman, Zool. pt. 76).
Doliolum affine, n.sp.
Salpa costata-tilesii, Quoy and Gaimard—Cuvier.

Fishes (Günther, Zool. pt. 78).
Scopelus coccoi (Cocco).

In addition, the following are recorded in the note-books:—An immense number of Coccospheres of all varieties, a few Rhabdospheres, *Alciopa* and other Annelids, Hyperids, *Atlanta*, Pteropods, and *Appendicularia*. Tow-nets were sent down to 200 fathoms, but the line parted when hauling in.

Station 288.

Station 288 (Sounding 433), Tahiti to Valparaiso (see Chart 38, and Diagrams 19 and 20).

October 21, 1875; lat. 40° 3′ S., long. 132° 58′ W.
Temperature of air at noon, 55°·0; mean for the day, 53°·0.
Temperature of water:—

Surface,	54·5	400 fathoms,	41·9
25 fathoms,	54·2	500 „	41·0
50 „	51·1	600 „	40·0
75 „	50·6	700 „	39·0
100 „	49·8	800 „	38·2
125 „	48·3	900 „	37·5
150 „	47·1	1000 „	36·9
175 „	46·1	1100 „	36·5
200 „	45·2	1200 „	36·1
225 „	44·7	1300 „	35·9
250 „	44·2	1400 „	35·7
275 „	43·8	1500 „	35·5
300 „	43·3	Bottom,	34·8

Density at 60° F. at surface, 1·02561; 2125 fathoms, 1·02573; bottom, 1·02564.
Depth, 2600 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5 A.M. shortened and furled sails, and proceeded under steam to sound. At 6 A.M. sounded in 2600 fathoms. In this instance the sounding-tube had buried itself about eighteen inches into the deposit, and the section brought up was of a uniform red colour throughout, there being no evidence of different layers varying in composition, as indicated in some of the last few soundings. Obtained serial temperatures down to

1500 fathoms. The carbonic acid was determined in bottom water, and amounted to 55·0 milligrammes per litre. At 9.30 A.M. completed observations and made all plain sail. *Diomedea exulans*, *Diomedea melanophrys* (?), *Procellaria capensis*, mutton birds, two kinds of black petrels, and *Prion turtur* (?), were seen. STATION 288.

Valparaiso distant at noon, 2983 miles. Made good 77 miles. Amount of current 17 miles, direction S. 19° W.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Lampoxanthium tetractinium, Haeckel.
Rhaphidozoum asperum, Haeckel.
Cenosphæra mellifica, Haeckel.
Thecosphæra micropora, Haeckel.
Pharyngosphæra stomodæa, Haeckel (?).
Siphonosphæra chonophora, Haeckel.
Hexaloncharium hystricinum, Haeckel.
Cubaxonium spongiosum, Haeckel.
Acanthosphæra micropora, Haeckel.
Coscinomma endosiphon, Haeckel.
Diplosphæra polygonalis, Haeckel.
Octodendron araucaria, Haeckel.
Cypassis palliata, Haeckel.
Sethodiscus microporus, Haeckel.
Heliodrymus ramosus, Haeckel.
Archidiscus trithalamus, Haeckel.
Myelastrum ciliatum, Haeckel.
Pentalastrum cometa, Haeckel.
Spongaster cruciatus, Haeckel.
Larcidium dodecanthum, Haeckel.
Dizonium ellipticum, Haeckel.
Octopyle octostyle, Haeckel.
Tholostaurus tetrabelonis, Haeckel.
Staurotholonium octodoronium, Haeckel.
Tholospira spinosa, Haeckel.
Astrolophus stellaris, Haeckel.
Actinastrum legitimum, Haeckel.
Acanthonia concava, Haeckel.
Xiphacantha platyptera, Haeckel.
Xiphoptera icosactena, Haeckel.
Amphilonche lancetta, Haeckel.
Phractaspis condylophora, Haeckel.
Dorataspis macrocantha, Haeckel.
Tessaraspis tetragonalis, Haeckel.
Thoracaspis circopora, Haeckel.
Hexaconus serratus, Haeckel.
Hexacolpus trypanon, Haeckel.
Plagonium distriactis, Haeckel.
Sethoconus virgultus, Haeckel.
Pterocorys prismatica, Haeckel.
Stichopterium dictyopodium, Haeckel.
Aulodendron australe, Haeckel.
Gazelletta bifurca, Haeckel.

SIPHONOPHORÆ (Haeckel, Zool. pt. 77).

Discalia medusina, n.sp.
Athoria bractealis, n.sp.
Strobalia conifera, n.sp.
Cystalia monogastrica, n.sp.

COPEPODA (Brady, Zool. pt. 23).

Calanus valgus, n.sp.
„ *propinquus*, n.sp.
„ *tonsus*, n.sp.
Hemicalanus longicornis, Claus.
Pleuromma abdominale (Lubbock).
Heterochæta spinifrons, Claus.
Leuckartia flavicornis, Claus (?).
Euchæta (?) *philippii*, n.sp.
Centropages violaceus (Claus).
Miracia efferata, Dana.
Lubbockia squillimana, Claus.

AMPHIPODA (Stebbing, Zool. pt. 67).

Phorcorrhaphis zamboangæ, n.sp.
Eupronoë minuta, Claus.

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Schizopoda (Sars, Zool. pt. 37).

Euphausia pellucida, Dana.
,, *splendens*, Dana.
Thysanoëssa gregaria, n.sp.

Pteropoda (Pelseneer, Zool. pt. 65).

Cuvierina columnella (Rang).

Cephalopoda (Hoyle, Zool. pt. 44).

Onychoteuthis sp. (?).

Tunicata (Herdman, Zool. pt. 76).

Salpa echinata, n.sp.

In addition, the following are recorded in the note-books from the tow-nets, two of which were sent down to 200 fathoms:—*Peridinium*, *Globigerina*, *Hastigerina*, *Pulvinulina*, large Medusæ (*Pelagia*), *Sagitta*, *Alciopa*, *Tomopteris*, *Cypridina*, *Saphirina*, *Copilia*, Hyperids, larvæ of *Euphausia* and other Decapods, *Lucifer*, small shells, *Atlanta*, Pteropods (naked and shelled) and larvæ, *Appendicularia*, *Doliolum*, and small Scopelids with phosphorescent dots and brilliant scales. The Medusæ gave off phosphorescence when touched, apparently from all parts of the body, and the eyes of the *Euphausiæ* became very brilliantly phosphorescent now and then and also when agitated. The specimens of *Pulvinulina micheliniana* were very numerous, and the shells were surrounded by a yellowish-green coloured mass of granular protoplasm. The protoplasmic matter within the shell coloured deeply with carmine. Mixed with the protoplasm surrounding the shells were numerous Coccospheres, Rhabdospheres, and Diatoms.

Station 289.

Station 289 (Sounding 434), Tahiti to Valparaiso (see Chart 38 and Diagram 20).

October 23, 1875; lat. 39° 41′ S., long. 131° 23′ W.
Temperature of air at noon, 50°·8; mean for the day, 51°·2.
Temperature of water:—

Surface,	54·5	400 fathoms,	41·2
25 fathoms,	54·0	500 ,,	39·5
50 ,,	49·2	600 ,,	38·2
75 ,,	48·9	700 ,,	37·5
100 ,,	48·3	800 ,,	37·0
125 ,,	47·5	900 ,,	36·7
150 ,,	46·9	1000 ,,	36·4
175 ,,	46·2	1100 ,,	36·2
200 ,,	45·6	1200 ,,	36·0
225 ,,	45·0	1300 ,,	35·8
250 ,,	44·4	1400 ,,	35·6
275 ,,	43·8	1500 ,,	35·5
300 ,,	43·2	Bottom,	34·8

Density at 60° F.:— STATION 289.

Surface,	1·02533	300 fathoms,	1·02539
25 fathoms,	1·02538	400 „	1·02541
50 „	1·02527	800 „	1·02536
100 „	1·02536	2075 „	1·02554
200 „	1·02538	Bottom,	1·02565

Depth, 2550 fathoms; deposit, Red Clay, containing no carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. shortened and furled sails, and proceeded under steam. At 6 A.M. sounded in 2550 fathoms. No trace of the bottom was found in the sounding-tube, nor adhering to the outside. At 7 A.M. put trawl over and veered 3100 fathoms. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in bottom water, and amounted to 47·4 milligrammes per litre. At 1 P.M. commenced heaving in trawl, which came up at 3.20 P.M. containing several specimens, over a bushel of manganese nodules, three large earbones of Cetaceans, fragments of bones, and two sharks' teeth, all deeply embedded in manganese. At 3.30 P.M. made all plain sail. The usual birds, as noted at the last two Stations, were about the ship.

Valparaiso distant at noon, 2907 miles. Made good 18 miles. Amount of current 7 miles, direction N. 7° W.

The following species are recorded in the Zoological Reports from the trawl at this Station:— ANIMALS FROM TRAWL.

HEXACTINELLIDA (Schulze, Zool. pt. 53).

Hyalostylus dives, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Trachycaulus gurlittii, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Hyalonema (*Stylocalyx*) *tenerum*, n.sp. Two specimens; obtained at no other locality.

ASTEROIDEA (Sladen, Zool. pt. 51).

Freyella benthophila, n.sp. Two specimens; obtained at no other locality. Recorded subsequently from Indian Ocean ("Investigator").

PHYLLOCARIDA (Sars, Zool. pt. 56).

Nebaliopsis typica, n.g., n.sp. One specimen; obtained also at Station 146. Only species of the genus.

MACRURA (Spence Bate, Zool. pt. 52).

Hepomadus inermis, n.g., n.sp. One specimen; obtained at no other locality.

Gennadas parvus, n.g., n.sp. One specimen; for distribution see Station 45.

Station 289. Fishes (Günther, Zool. pt. 57).

Bathypterois longicauda, n.g., n.sp. One specimen; obtained at no other locality.

In addition to the foregoing, the following are recorded in the Station-book:—Esperid Sponge (osculum only), two *Serpula* tubes attached to manganese nodules.

Excluding Protozoa, over a dozen specimens of invertebrates and fishes were obtained at this Station, belonging to about 10 species, of which 8 (all those reported) are new to science, including representatives of 6 new genera; 6 of the new species and 2 new genera were not obtained elsewhere.

Organisms from Surface-Nets. Surface Organisms.—The following species of Radiolaria are recorded from the surface at this Station:—

Radiolaria (Haeckel, Zool. pt. 40).

Siphonosphæra chonophora, Haeckel.
Sphærostylus diadema, Haeckel.
Cenellipsis micropora, Haeckel.
Druppocarpus ananassa, Haeckel.
Ceriaspis inermis, Haeckel.
Sethocephalus platycryphalus, Haeckel.
Cannorrhaphis lampoxanthium, Haeckel.

In the tow-nets attached to the trawl were several forms of Phæodaria (*Challengeria* and *Tuscarora*) and other Radiolaria, *Cypridinæ*, shrimps and smaller Crustacea, and two small Sternoptychids, while from the surface the usual surface things, as noted at the last Station, were obtained, including some broken portions of *Ethmodiscus*, and small Foraminifera (principally *Pulvinulina*).

Station 290. **Station 290** (Sounding 435), Tahiti to Valparaiso (see Chart 38 and Diagram 20).

October 25, 1875; lat. 39° 16′ S., long. 124° 7′ W.
Temperature of air at noon, 52°·8; mean for the day, 50°·1.
Temperature of water:—

	°		°
Surface,	52·5	400 fathoms,	42·0
25 fathoms,	52·0	500 „	40·7
50 „	49·6	600 „	39·4
75 „	48·6	700 „	37·8
100 „	47·6	800 „	36·9
125 „	46·7	900 „	36·4
150 „	46·0	1000 „	36·2
175 „	45·3	1100 „	36·0
200 „	44·9	1200 „	35·8
225 „	44·5	1300 „	35·6
250 „	44·1	1400 „	35·3
275 „	43·7	1500 „	35·1
300 „	43·4	Bottom,	34·9

Density at 60° F. at surface, 1·02533 ; 1850 fathoms, 1·02534 ; bottom, 1·02546. Depth, 2300 fathoms ; deposit, Red Clay. Station 290.

At 9.20 A.M. shortened and furled sails, and proceeded under steam. At 10 A.M. sounded in 2300 fathoms. Took serial temperatures down to 1500 fathoms. At 1.40 P.M. completed observations and made sail. The following birds were noticed :— *Diomedea exulans*, some white, some mottled brown, and some black, *Diomedea melanophrys* (?), mutton birds (*Œstrelata lessoni*), *Procellaria capensis*, *Prion turtur*, a small black bird about the size of the Cape pigeon, and a larger black bird ; mutton birds were the most numerous.

Valparaiso distant at noon, 2563 miles. Made good 157 miles. Amount of current 11 miles, direction N.

Surface Organisms.—The following species of Radiolaria are recorded from the surface at this Station :— Organisms from Surface Nets.

Radiolaria (Haeckel, Zool. pt. 40).

Siphonosphæra chonophora, Haeckel.	*Tetrapyle transversa*, Haeckel.
Amphymenium monstrosum, Haeckel.	*Stauraspis xiphacantha*, Haeckel.

In addition, the following are recorded in the note-books :—Small Foraminifera, Medusæ (*Pelagia*), *Sagitta*, *Cypridina*, *Saphirina* and other Copepods, Hyperids and other Amphipods, *Euphausia*, larvæ of *Sergestes*, *Doliolum*, &c.

Station 291 (Sounding 436), Tahiti to Valparaiso (see Chart 38 and Diagram 20). Station 291.

October 27, 1875 ; lat. 39° 13′ S., long. 118° 49′ W.

Temperature of air at noon, 56°·3 ; mean for the day, 52°·6.

Temperature of water :—

Surface,	53·0	400 fathoms,	41·4
25 fathoms,	52·1	500 „	40·1
50 „	50·8	600 „	39·2
75 „	49·5	700 „	38·3
100 „	47·7	800 „	37·5
125 „	46·1	900 „	36·8
150 „	45·4	1000 „	36·2
175 „	44·9	1100 „	35·9
200 „	44·4	1200 „	35·8
225 „	44·0	1300 „	35·7
250 „	43·6	1400 „	35·5
275 „	43·3	1500 „	35·4
300 „	42·9	Bottom,	34·6

Station 291.

Density at 60° F. :—

Surface,	1·02548	300 fathoms,	1·02536
25 fathoms,	1·02523	400 „	1·02533
50 „	1·02523	800 „	1·02546
100 „	1·02536	1775 „	1·02528
200 „	1·02516	Bottom,	1·02550

Depth, 2250 fathoms; deposit, Red Clay.

At 4.20 A.M. shortened and furled sails. At 5 A.M. proceeded under steam, and at 5.30 A.M. sounded in 2250 fathoms. Inside the sounding-tube were two or three small pellets of Red Clay. At 7.15 A.M. put trawl over. Took serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 1775 fathoms and bottom, and amounted respectively to 42·3 and 46·4 milligrammes per litre. At 12.10 P.M. commenced heaving in trawl, which came up at 2.20 P.M. containing a few specimens, and a small manganese nodule with egg-capsule attached. The leads and ironwork of the trawl were covered in some places with streaks of the black peroxide of manganese, as if they had been hauled over a bottom where manganese was abundant. The following birds were noticed:—*Diomedea exulans*, *Diomedea melanophrys*, *Prion turtur*, *Procellaria capensis*, mutton birds, black night-hawks, a white bird of the size of the mutton bird, and a large black bird—probably either *Diomedea fuliginosa* or *Procellaria maxima*.

Valparaiso distant at noon, 2310 miles. Made good 102 miles. Amount of current 11 miles, direction E.

Animals from Trawl.

The following species are recorded from the trawl at this Station :—

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Esperella biserialis, n.sp. One specimen; obtained also at Station 281.

Axoniderma mirabile, n.g., n.sp. Two specimens; obtained at no other locality. Only species of the genus.

In addition to the foregoing, the following are recorded in the Station-book :— Tubularian Hydroid with stout arborescent chitinous stem, and with small Campanularian (?) upon it, mutilated fragment of a very delicate Polyzoon, single limb of a shrimp.

Organisms from Surface Nets.

Surface Organisms.—The following species of Radiolaria are recorded from the surface at this Station ;—

RADIOLARIA (Haeckel, Zool. pt. 40). STATION 291.

Carposphæra cubaxonia, Haeckel.
Styptosphæra stupacea, Haeckel.
Siphonosphæra chonophora, Haeckel.
Hexalonche setosa, Haeckel.
Leptosphæra reticulum, Haeckel.
Octodendron verticillatum, Haeckel.
Myelastrum heteropterum, Haeckel.
Amphipyle hexaceros, Haeckel.
Tholostaurus octobelonis, Haeckel.
Actinelius polyacanthus, Haeckel.
Litholophus fasciculus, Haeckel.
Xiphacantha emarginata, Haeckel.
Stauracantha diplostaura, Haeckel.
Diplocolpus sulcatus, Haeckel.
Hexaplecta tricladonia, Haeckel.
Sethophormis leptopilium, Haeckel.
Aulacantha cannulata, Haeckel.
Sagoscena tentorium, Haeckel.

In addition, the following are recorded in the note-books :—*Ceratium* (*Peridinium*) *tripos*, Coccospheres, *Globigerina*, *Hastigerina*, *Pulvinulina*, Siphonophoræ, *Sagitta*, *Alciopa*, Aphroditacean larvæ, *Cypridina*, Copepods, Hyperids, small shells, Pteropods, small Cephalopod, *Appendicularia*, and *Fritillaria*. In the tow-nets attached to the trawl were a small Sternoptychid, remains of another small fish, a small shrimp and other small deep-sea Crustacea, and a number of Phæodaria (*Challengeria* and *Tuscarora*) and other Radiolaria, along with many surface things. The *Pulvinulina* shells were again surrounded with yellow-coloured granular sarcode.

Station 292 (Sounding 437), Tahiti to Valparaiso (see Chart 38 and Diagram 20). STATION 292.

October 29, 1875 ; lat. 38° 43′ S., long. 112° 31′ W.
Temperature of air at noon, 48°·5 ; mean for the day, 50°·0.
Temperature of water :—

Surface,	53°·2	400 fathoms,	41°·1
25 fathoms,	52·8	500 „	40·0
50 „	51·7	600 „	39·0
75 „	50·0	700 „	38·3
100 „	48·5	800 „	37·6
125 „	47·4	900 „	37·1
150 „	46·2	1000 „	36·6
175 „	45·2	1100 „	36·2
200 „	44·3	1200 „	36·0
225 „	43·9	1300 „	35·8
250 „	43·5	1400 „	35·5
275 „	43·5	1500 „	35·3
300 „	43·0	Bottom,	35·2

Density at 60° F. at surface, 1·02532 ; 1600 fathoms (?), 1·02532 ; bottom, 1·02559.
Depth, 1600 fathoms ; deposit, Globigerina Ooze, containing 83·75 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Station 292.

At 1.15 P.M. shortened and furled sails, and proceeded under steam. At 2 P.M. sounded in 1600 fathoms. The sounding-tube had sunk several inches into the deposit and brought up half a litre of the ooze, which was of a brown colour, but on shaking up in water the Foraminifera separated from the red amorphous matter and settled as a white layer at the bottom of the glass. There were a great many particles of palagonite and other volcanic matter, as well as numerous small particles of peroxide of manganese, many of the Foraminifera being studded with grains of this substance. The association of the basic volcanic materials with the manganese in this Globigerina Ooze is suggestive of the origin of the manganese. Put trawl over and veered 2100 fathoms. Obtained serial temperatures down to the bottom. The carbonic acid was determined in water from the surface, and amounted to 36·6 milligrammes per litre. At 6 P.M. commenced heaving in trawl, but at 7.40 P.M. the trawl-rope carried away, and the trawl, tow-nets, and 1600 fathoms of line were lost. Made all plain sail. The usual birds were noticed, and one of the mutton birds was caught.

Valparaiso distant at noon, 2022 miles. Made good 162 miles. Amount of current 13 miles, direction N. 13° E.

Organisms from Surface-Nets.

Surface Organisms.—The following are recorded in the note-books from the surface at this Station :—*Peridinium tripos*, *Globigerina*, *Pulvinulina*, Acanthometræ and other Radiolaria, *Diphyes* and other Siphonophoræ, *Sagitta*, *Tomopteris*, *Cypridina*, *Copilia* and other Copepods, small shells, *Atlanta*, Pteropods, *Appendicularia*, and *Doliolum*.

The following species are recorded from the surface of the South Pacific in October 1875, the exact locality not being noted :—

Amphipoda (Stebbing, Zool. pt. 67).

Pronoe capito, Guérin.
Parapronoë clausi, n.sp.
Brachyscelus latipes, n.sp.
„ *bovallii*, n.sp.

Station 293.

Station 293 (Sounding 438), Tahiti to Valparaiso (see Chart 38 and Diagram 20).

November 1, 1875 ; lat. 39° 4′ S., long. 105° 5′ W.
Temperature of air at noon, 57°·8 ; mean for the day, 56°·4.
Temperature of water :—

Surface,	53°·7	125 fathoms,	46°·4
25 fathoms,	52·9	150 „	45·4
50 „	51·7	175 „	44·6
75 „	50·1	200 „	44·1
100 „	48·3	225 „	43·8

STATION 293.

250 fathoms,	43·5	900 fathoms,	37·7
275 „	43·2	1000 „	37·1
300 „	42·9	1100 „	36·8
400 „	41·8	1200 „	36·5
500 „	40·9	1300 „	36·3
600 „	40·0	1400 „	36·0
700 „	39·2	1500 „	35·8
800 „	38·4	Bottom,	34·4

Density at 60° F. :—

Surface,	1·02522	300 fathoms,	1·02538
25 fathoms,	1·02523	400 „	1·02525
50 „	1·02517	800 „	1·02548
100 „	1·02531	1550 „	1·02563
200 „	1·02538	Bottom,	1·02573

Depth, 2025 fathoms; deposit, Globigerina Ooze, containing 44·68 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. shortened and furled sails, and proceeded under steam. At 5.30 A.M. sounded in 2025 fathoms. In this, as in the last Station, the deposit, though a Globigerina Ooze, was of a dark brown colour, which was due to the large quantity of the peroxides of iron and manganese. Associated with the Foraminiferous shells were very many fragments of basic volcanic rocks. Some of the manganese nodules had a nucleus of hard black volcanic glass (sideromelan), which was surrounded by a zone of altered material (palagonite). At 7 A.M. put trawl over and veered 2500 fathoms. Obtained serial temperatures down to 1500 fathoms. At 1 P.M. commenced heaving in trawl, which came up at 3 P.M. with several specimens, about a dozen manganese nodules, and two sharks' teeth. Made all plain sail. The following birds were noticed :—*Diomedea exulans* (two large white ones remained near the ship, and twice or thrice took the hook, but were not landed on board), molly mauks (*Diomedea melanophrys* ?), *Procellaria capensis*, mutton birds, several petrels rather less in size than the Cape pigeon but with longer wings, and a large petrel-like bird less than the molly mauk.

Valparaiso distant at noon, 1661 miles. Made good 141 miles. Amount of current 6 miles, direction S.

ANIMAL FROM TRAWL.

The following species is recorded from the trawl at this Station :—

ACTINIARIA (Hertwig, Zool. pt. 15).

Corallimorphus profundus, Moseley, n.g., n.sp. One specimen; obtained also at Station 300, 1375 fathoms.

Station 293.

In addition to the foregoing, the following are recorded in the Station-book :— Fragment of *Farrea* (?), *Stephanoscyphus* on manganese nodules, Gorgonoid—small base of stem of *Mopsea* (?) attached to manganese nodule, *Catenicella*, *Caberea* (?), and another Polyzoon.

Organisms from the Deposit.

The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.). :—

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 78 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
„ „ var. *murrhyna*, Schwager.
„ *elongata*, d'Orbigny.
Spiroloculina tenuis (Czjzek).
Miliolina venusta (Karrer).
Planispirina sigmoidea, Brady.
Hyperammina vagans, Brady.
Haplophragmium latidorsatum (Bornemann).
Verneuilina pygmæa (Egger).
Gaudryina pupoides, d'Orbigny.
„ „ var. *chilostoma*, Reuss.
Bulimina elegans, d'Orbigny, var. *exilis*, Brady.
„ sp. (?).
Virgulina pauciloculata, Brady (?).
„ *subdepressa*, Brady.
„ *subsquamosa*, Egger.
„ *texturata*, Brady.
Cassidulina crassa, d'Orbigny.
„ *subglobosa*, Brady.
Chilostomella ovoidea, Reuss.
Lagena alveolata, Brady, var. *caudigera*, Brady.
„ *desmophora*, Rymer Jones.
„ *fimbriata*, Brady.
„ *formosa*, Schwager.
„ *globosa* (Montagu).
„ *hexagona* (Williamson).
„ *laevis* (Montagu).
„ *marginata* (Walker and Boys).
„ „ var. *semimarginata*, Reuss.
„ *orbignyana* (Seguenza).
Lagena stelligera, Brady.
„ *torquata*, Brady.
„ *truncata*, Brady.
„ sp. (?).
Nodosaria communis, d'Orbigny.
„ *mucronata* (Neugeboren).
„ sp. (?).
Vaginulina legumen (Linné).
„ sp. (?).
Uvigerina asperula, Czjzek.
× *Globigerina bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *dubia*, Egger.
× „ *inflata*, d'Orbigny.
× *Orbulina universa*, d'Orbigny.
× *Pullenia obliquiloculata*, Parker and Jones.
„ *sphæroides* (d'Orbigny).
Truncatulina pygmæa, Hantken.
„ *tenera*, Brady.
„ *ungeriana* (d'Orbigny).
„ *wuellerstorfi* (Schwager).
„ sp. (?).
× *Pulvinulina crassa* (d'Orbigny).
„ *exigua*, Brady.
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
× „ *patagonica* (d'Orbigny).
„ *pauperata*, Parker and Jones.
Nonionina umbilicatula (Montagu).

Radiolaria (Haeckel, Zool. pt. 40).

Distephanus diadema, Haeckel.
Aulactinium actinelium, Haeckel.
Aulographis verticillata, Haeckel.
Auloceros arborescens, Haeckel.
Aulospathis bifurca, Haeckel.
Aulodendron pacificum, Haeckel.
Sagosphæra furcilla, Haeckel.
Saymidium quadricorne, Haeckel.

Aulonia pentagonia, Haeckel.
Gazelletta medusina, Haeckel.
Haeckeliana porcellana, Murray.
Tuscarora belknapii, Murray.
Conchopsis navicula, Haeckel.
Cœlodendrum lappaceum, Haeckel.
Cœlographis triangulum, Haeckel.

Station 293.

Surface Organisms.—The following species are recorded from the surface and deep tow-nets in the vicinity of this Station :— Organisms from Surface-Nets.

Radiolaria (Haeckel, Zool. pt. 40).

Siphonosphæra chonophora, Haeckel.
Stauralastrum cruciforme, Haeckel.
Aulacantha cannulata, Haeckel.

Amphipoda (Stebbing, Zool. pt. 67).

Synopioides macronyx, n.g., n.sp.

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *acicula* (Rang).
„ *pyramidata*, Linné.
Cavolinia longirostris (Lesueur).

In addition, the following are recorded in the note-books from the nets at the surface and down to 30 fathoms :—*Peridinium tripos* and other species, *Globigerina*, *Pulvinulina micheliniana*, *Sagitta*, Copepods, Hyperids, larval Decapods, small Lamellibranch shells, Pteropod larvæ, *Appendicularia*, and *Doliolum*. The tow-nets at the trawl procured several forms of Phæodaria (*Tuscarora*, &c.) and other Radiolaria, *Hastigerina*, *Cypridina*, *Saphirina*, *Euphausia*, &c.

Station 294 (Sounding 439), Tahiti to Valparaiso (see Chart 38 and Diagram 20). Station 294.

November 3, 1875 ; lat. 39° 22′ S., long. 98° 46′ W.
Temperature of air at noon, 62°·0 ; mean for the day, 58°·4.
Temperature of water :—

Surface,	57°·5	700 fathoms,	38°·3
25 fathoms,	55°·1	800 „	37°·7
50 „	52°·5	900 „	37°·1
75 „	50°·1	1000 „	36°·7
100 „	48°·2	1100 „	36°·3
125 „	46°·5	1200 „	36°·0
150 „	45°·5	1300 „	35°·9
175 „	44°·7	1400 „	35°·8
200 „	44°·1	1500 „	35°·6
225 „	43°·5	1600 „	35°·5
250 „	43°·1	1700 „	35°·3
275 „	42°·7	1800 „	35°·2
300 „	42°·2	1900 „	35°·0
400 „	40°·8	2000 „	34°·9
500 „	39°·5	2100 „	34°·8
600 „	38°·8	Bottom,	34°·6

Station 294.

Density at 60° F. :—

Surface,	1·02519	300 fathoms,	1·02542
25 fathoms,	1·02525	400 „	1·02538
50 „	1·02519	800 „	1·02544
100 „	1·02536	1775 „	1·02577
200 „	1·02548		

Depth, 2270 fathoms; deposit, Red Clay, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. shortened and furled sails. At 5.30 A.M. proceeded under steam and sounded in 2270 fathoms. Took serial temperatures from surface to bottom. The carbonic acid was determined in water from 25 and 400 fathoms, and amounted respectively to 33·1 and 44·6 milligrammes per litre. At 12.50 P.M. proceeded under steam. The weather was calm, and as usual on such occasions very few birds were seen about the ship; occasionally a prion, mutton bird, or *Diomedea exulans*, would bear in sight, course around the ship, and soon disappear.

Valparaiso distant at noon, 1368 miles; Juan Fernandez, 1028 miles. Made good 119 miles. Amount of current 10 miles, direction S. 11° W.

The following species is recorded from this Station :—

Deep-Sea Keratosa (Haeckel, Zool. pt. 82).

Holopsamma argillaceum, n.sp. One specimen; obtained at no other locality.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Copepoda (Brady, Zool. pt. 23).

Calanus tonsus, n.sp.

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Styliola*) *subula* (Quoy and Gaimard).

Cuvierina columnella (Rang).

In addition, the following are recorded in the note-books :—*Peridinium tripos* and other species, *Globigerina*, *Hastigerina*, *Pulvinulina micheliniana*, Acanthometræ and other Radiolaria, *Sagitta*, *Copilia*, *Setella*, and other Copepods, larvæ of Podophthalmiæ, *Appendicularia*, *Salpa*, and *Doliolum*. Tow-nets were sent down to 200 fathoms and procured, in addition to the organisms noted from the surface, many Medusæ, Siphonophoræ, Ctenophoræ, *Cypridinæ*, Pteropods, several stages of *Doliolum*, along with several forms of Radiolaria (*Challengeria*, &c.), many small Amœboid particles, and Infusoria. The specimens of *Pulvinulina* were very numerous and very fine and large,

some of them being quite as large as any found in the deposits at the bottom. In a great many instances they were surrounded with yellow-coloured sarcode; apparently this expands in the form of a large float, but we have never been able to get a specimen fully expanded as in the case of *Hastigerina*. STATION 294.

Station 295 (Sounding 440), Tahiti to Valparaiso (see Chart 38 and Diagram 20). STATION 295.

November 5, 1875; lat. 38° 7′ S., long. 94° 4′ W.
Temperature of air at noon, 60°·8; mean for the day, 58°·8.
Temperature of water :—

	°		°
Surface, ...	58·5	400 fathoms, . . .	41·3
25 fathoms, . . .	55·7	500 „ . . .	40·3
50 „ . . .	53·0	600 „ . . .	39·5
75 „ . . .	50·5	700 „ . . .	38·7
100 „ . . .	47·8	800 „ . . .	38·0
125 „ . . .	46·0	900 „ . . .	37·4
150 „ . . .	44·8	1000 „ . . .	36·8
175 „ . . .	44·0	1100 „ . . .	36·3
200 „ . . .	43·4	1200 „ . . .	36·1
225 „ . . .	43·0	1300 „ . . .	35·9
250 „ . . .	42·6	1400 „ . . .	35·6
275 „ . . .	42·3	Bottom, . . .	35·3
300 „ . . .	42·0		

Density at 60° F. at surface, 1·02536; 1000 fathoms, 1·02563; bottom, 1·02562.
Depth, 1500 fathoms; deposit, Globigerina Ooze.

At 10 A.M. stopped. Put trawl over and veered 2500 fathoms. Sounded in 1500 fathoms. The sounding-tube contained some water, which on being allowed to settle gave indications of a red-coloured Globigerina Ooze, but the tow-nets at the trawl contained many fragments of augite-andesite, which may possibly have been derived from a comparatively recent volcanic outflow at the bottom. Took serial temperatures from surface to bottom. The carbonic acid was determined in bottom water, and amounted to 47·5 milligrammes per litre. At 3 P.M. commenced heaving in trawl, having previously shortened the line to 1900 fathoms. It came up at 4.30 P.M. containing only a fish, which was still alive when taken out of the trawl. Made sail. Two specimens of *Diomedea exulans* were caught from the ship, and two mutton birds were shot from a boat; there were seen besides *Procellaria maxima* or *Procellaria gigantea*, *Procellaria capensis*, *Prion turtur*, Mother Carey's chickens, along with a molly mauk (?), *Diomedea fuliginosa* (?), and a small black petrel with white belly.

Station 295. Juan Fernandez distant at noon, 792 miles. Made good 115 miles. Amount of current 15 miles, direction N. 79° E.

Animal from Trawl. The following species is recorded from the trawl at this Station :—

Fishes (Günther, Zool. pt. 57).

Cyema atrum, n.g., n.sp. One specimen; obtained also at Station 158. Only species of the genus.

The following species are recorded in error from this Station, having evidently come from Station 298 (see Station 298) :—

Asteroidea (Sladen, Zool. pt. 51).

Hymenaster carnosus, n.sp.

Holothurioidea (Théel, Zool. pts. 13 and 39).

Benthodytes sanguinolenta, n.g., n.sp.
,, *mamillifera*, n.g., n.sp.
Cucumaria abyssorum, n.sp., var. *grandis*, nov.

Organisms from Surface-Nets. Surface Organisms.—The following species are recorded from the surface and deep tow-nets in the vicinity of this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Sphærozoum triactinium, Haeckel.
Rhaphidozoum polymorphum, Haeckel.
Siphonosphæra chonophora, Haeckel.
Echinomma echinidium, Haeckel.
Spongiomma spathillatum, Haeckel.
Centrocubus polystylus, Haeckel.
Spongocore puella, Haeckel.
Monozonium staurostylum, Haeckel.
Tholartus tripanis, Haeckel.
Amphitholonium acanthonium, Haeckel.
Zygostaurus longicornis, Haeckel.
Orophaspis diporaspis, Haeckel.
Icosaspis ornata, Haeckel.
Hylaspis barbata, Haeckel.
Phractopelta haliomma, Haeckel.
Belonaspis pandanus, Haeckel.
Sagoscena castra, Haeckel.
Castanella thomsoni, Haeckel.

Copepoda (Brady, Zool. pt. 23).

Calanus valgus, n.sp.
Euchæta hessei, n.sp.

Amphipoda (Stebbing, Zool. pt. 67).

Cyphocaris micronyx, n.sp.
Synopioides macronyx, n.g., n.sp.

Macrura (Spence Bate, Zool. pt. 52).

Sergestes longicollus, n.sp.

Pteropoda (Pelseneer, Zool. pt. 65).

Cavolinia inflexa (Lesueur).

Cephalopoda (Hoyle, Zool. pt. 44).

Cirroteuthis sp. (?).
Tracheloteuthis (?) sp.

TUNICATA (Herdman, Zool. pt. 76).

Salpa echinata, n.sp.
,, *mollis*, n.sp.
,, *cylindrica*, Cuvier.
,, *runcinata* - *fusiformis*, Chamisso—Cuvier.
Salpa democratica - *mucronata*, Forskål.
,, *scutigera* - *confœderata*, Cuvier—Forskål.

FISHES (Günther, Zool. pt. 78).

Scopelus coccoi (Cocco).

STATION 295.

In addition, the following are recorded in the note-books (November 5 to 8):—*Peridinium*, *Globigerina*, *Hastigerina*, *Pulvinulina*, large Medusæ (*Pelagia*), many forms of Siphonophoræ, Ctenophoræ (*Pleurobrachia* ?), *Sagitta*, *Tomopteris*, *Cypridina*, many Copepods, Hyperids, Phronimids, Stomatopod larvæ, *Euphausia*, *Lucifer*, Dohrn's larva, *Ianthina* and other small shells, various forms of Pteropods, many small transparent Cephalopods, several small Scopelids with phosphorescent dots, and fish eggs. In the deep nets attached to the trawl were several deep-sea Crustaceans, along with many Phæodaria and other Radiolaria. There was no phosphorescence on the surface at night, but the tow-net when drawn in at night showed many bright spots, due principally to a large species of *Pelagia*.

Station 296 (Sounding 441), Tahiti to Valparaiso (see Chart 38 and Diagram 20).

STATION 296.

November 9, 1875; lat. 38° 6′ S., long. 88° 2′ W.
Temperature of air at noon, 60°·8; mean for the day, 58°·6.
Temperature of water:—

	°		°
Surface, ...	59·8	500 fathoms, . . .	40·2
25 fathoms, . . .	56·8	600 ,, . . .	39·6
50 ,, . . .	54·6	700 ,, . . .	39·0
75 ,, . . .	52·2	800 ,, . . .	38·5
100 ,, . . .	50·1	900 ,, . . .	38·0
125 ,, . . .	48·1	1000 ,, . . .	37·5
150 ,, . . .	46·3	1100 ,, . . .	37·0
175 ,, . . .	45·0	1200 ,, . . .	36·6
200 ,, . . .	43·8	1300 ,, . . .	36·4
225 ,, . . .	43·2	1400 ,, . . .	36·2
250 ,, . . .	42·7	1500 ,, . . .	36·0
275 ,, . . .	42·1	1600 ,, . . .	35·8
300 ,, . . .	41·7	1700 ,, . . .	35·6
400 ,, . . .	40·8	Bottom, . . .	35·3

Station 296.

Density at 60° F. :—

Surface,	1·02536	300 fathoms,	1·02537
25 fathoms,	1·02525	400 „	1·02530
50 „	1·02527	800 „	1·02556
100 „	1·02520	1350 „	1·02552
200 „	1·02536	Bottom,	1·02544

Depth, 1825 fathoms; deposit, Globigerina Ooze, containing 64·34 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. shortened and furled sails, and proeeeded under steam. At 5.30 A.M. sounded in 1825 fathoms. Two layers were noticeable in the sounding-tube, a straw-coloured upper layer and a dark brown lower layer, which latter contained much manganese and very little carbonate of lime. Put trawl over and veered 2300 fathoms. Obtained serial temperatures from surface to bottom. The carbonic aeid was determined in bottom water and amounted to 44·7 milligrammes per litre. At 1 P.M. commenced heaving in trawl, which came up at 2.20 P.M. containing a few speeimens and a little deposit, while the attached tow-nets were filled with ooze. At 3 P.M. made sail. *Diomedea exulans*, *Diomedea melanophrys* (?), *Procellaria gigantea*, *Procellaria capensis*, mutton birds, *Prion turtur*, and several small Thalassidromas were seen.

Juan Fernandez distant at noon, 510 miles. Made good 124 miles. Amount of current 17 miles, direetion S. 30° W.

Animals from Trawl.

The following species are reeorded in the Zoologieal Reports from the trawl at this Station :—

Actiniaria (Hertwig, Zool. pt. 15).

Polystomidium patens, n.g., n.sp. One speeimen; obtained at no other loeality. Only species of the genus.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophiomusium lymani, Wyville Thomson. For distribution see Station 45.

Ophiotholia supplicans, n.g., n.sp. Obtained at no other loeality. Only species of the genus.

Echinoidea (Agassiz, Zool. pt. 9).

Cystechinus wyvillii, n.g., n.sp. Obtained also at Stations 146, 147, 158, 299, and 300.

Holothurioidea (Théel, Zool. pt. 39).

Pseudostichopus villosus, n.g., n.sp. One specimen; obtained also at Stations 61, 146, 147, 156, 157, 216A, 244, 302, and 325.

OSTRACODA (Brady, Zool. pt. 3). STATION 296.

Bairdia hirsuta, n.sp. Obtained also at Station 300, 1375 fathoms.
Cythere dictyon, n.sp. Widely distributed (see Station 24).
„ *normani*, Brady (?). Obtained also at Station 150.
„ *acanthoderma*, n.sp. For distribution see Station 64.
„ *dasyderma*, n.sp. Widely distributed (see Station 5).
Krithe producta, n.sp. Widely distributed (see Station 70).
Cytheropteron mucronalatum, n.sp. For distribution see Station 70.

In addition to the foregoing, the following are recorded in the Station-book :—Large spicule of *Hyalonema*, fragment of a second Holothurian, long coiled narrow flexible tube (probably the egg-capsule of a Mollusc), fragment of a shrimp, and a Polyzoon—one of the Salicornariadæ.

Excluding Protozoa, over 20 specimens of invertebrates were obtained at this Station, belonging to about 17 species, of which 10 are new to science, including representatives of 4 new genera; 2 of the new genera and species were not obtained elsewhere.

The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :— ORGANISMS FROM THE DEPOSIT.

FORAMINIFERA (Brady, Zool. pt. 22).—The pelagic species, which make up about 85 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
„ „ var. *murrhyna*, Schwager.
„ *elongata*, d'Orbigny.
Spiroloculina tenuis (Czjzek).
Miliolina circularis (Bornemann).
„ *seminulum* (Linné).
„ *valvularis* (Reuss) (?).
„ *venusta* (Karrer).
Pelosina sp. (?).
Psammosphæra fusca, Schulze.
Hyperammina ramosa, Brady.
„ *subnodosa*, Brady.
„ *vagans*, Brady.
„ sp. (?).
Marsipella cylindrica, Brady.
Aschemonella (?) sp.
Rhizammina algæformis, Brady.
Reophax dentaliniformis, Brady.
Haplophragmium anceps, Brady.
„ *globigeriniforme* (Parker and Jones).
„ *latidorsatum* (Bornemann).
Thurammina albicans, Brady.
„ *papillata*, Brady.
Hormosina normani, Brady.
Ammodiscus gordialis (Jones and Parker).
Trochammina galeata, Brady.
Textularia aspera, Brady.
Verneuilina propinqua, Brady.
„ *pygmæa* (Egger).
Gaudryina pupoides, d'Orbigny.
Clavulina communis, d'Orbigny.
Bulimina elegans, d'Orbigny.
„ *elongata*, d'Orbigny.
„ *ovata*, d'Orbigny.
Virgulina schreibersiana, Czjzek.
„ *subdepressa*, Brady.
„ *subsquamosa*, Egger.
„ *texturata*, Brady.
Bolivina punctata, d'Orbigny.
„ *textilarioides*, Reuss.
Pleurostomella subnodosa, Reuss.
Cassidulina subglobosa, Brady.
Ehrenbergina serrata, Reuss.

Station 296.

Chilostomella ovoidea, Reuss.
Lagena acuta (Reuss).
„ *alveolata*, Brady.
„ „ var. *caudigera*, Brady.
„ *apiculata*, Reuss.
„ *auriculata*, Brady.
„ *desmophora*, Rymer Jones.
„ *globosa* (Montagu).
„ *gracilis*, Williamson.
„ *gracillima* (Seguenza).
„ *hispida* (Reuss).
„ *lævis* (Montagu).
„ *lagenoides* (Williamson).
„ *longispina*, Brady.
„ *marginata* (Walker and Boys).
„ *multicosta* (Karrer).
„ *orbignyana* (Seguenza).
„ *seminiformis*, Schwager.
„ *seminuda*, Brady.
„ *squamoso-marginata*, Parker and Jones.
„ *staphyllearia*, Schwager.
„ *truncata*, Brady.
Nodosaria abyssorum, Brady.
„ *communis*, d'Orbigny.
„ *consobrina*, d'Orbigny, var. *emaciata*, Reuss.
„ *intercellularis*, Brady.
„ (*Glandulina*) *lævigata*, d'Orbigny.
„ *verruculosa*, Neugeboren.
Marginulina costata (Batsch).
Cristellaria convergens, Bornemann (?).
„ *reniformis*, d'Orbigny.
Polymorphina lanceolata, Reuss.
„ *longicollis*, Brady.
„ *rotundata*, Bornemann.
Uvigerina asperula, Czjzek.
„ *pygmæa*, d'Orbigny.
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *digitata*, Brady.
× „ *dubia*, Egger.
× „ *inflata*, d'Orbigny.
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Pullenia obliquiloculata*, Parker and Jones.
„ *quinqueloba*, Reuss.
„ *sphæroides* (d'Orbigny).
Sphæroidina bulloides, d'Orbigny.
× „ *dehiscens*, Parker and Jones.
Truncatulina haidingerii (d'Orbigny).
„ *humilis*, Brady.
„ *lobatula* (Walker and Jacob).
„ *pygmæa*, Hantken.
„ *wuellerstorfi* (Schwager).
Anomalina grosserugosa (Gümbel).
× *Pulvinulina canariensis* (d'Orbigny).
× „ *crassa* (d'Orbigny).
„ *exigua*, Brady.
„ *favus*, Brady.
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
× „ *patagonica* (d'Orbigny).
„ *pauperata*, Parker and Jones.
„ *umbonata*, Reuss.
Rotalia orbicularis, d'Orbigny.
„ *soldanii*, d'Orbigny.
Nonionina pompilioides (Fichtel and Moll).
„ *umbilicatula* (Montagu).

Radiolaria (Haeckel, Zool. pt. 40).

Hexancistra ancorata, Haeckel.
Axoniscus trigonus, Haeckel.
Anthospyris doronicum, Haeckel.
Clistophæna enneolena, Haeckel.
Stichopilium thoracopterum, Haeckel.
Aulonia pentagonia, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Spongocore puella, Haeckel.
Astrolophus solaris, Haeckel.
Sagoscena castra, Haeckel.
Castanella thomsoni, Haeckel.

Copepoda (Brady, Zool. pt. 23).

Calanus valgus, n.sp.
„ *tonsus*, n.sp.

Amphipoda (Stebbing, Zool. pt. 67).

Hyperia luzoni, n.sp., (young ?).

In addition, the following are recorded in the note-books from the surface and down to 30 fathoms :—*Ceratium* (*Peridinium*) *tripos*, *Globigerina*, *Orbulina*, *Hastigerina*, Acanthometræ and compound Radiolaria, *Sagitta*, *Tomopteris*, *Evadne*, *Cypridina*, *Euphausia* and larvæ, larvæ of *Sergestes*, *Atlanta*, *Oxygyrus*, Pteropods, small transparent Cephalopods, *Appendicularia*, *Fritillaria*, *Doliolum*, *Salpa*, fish eggs. A large whale was seen close to the ship. STATION 296.

Station 297 (Sounding 442), Tahiti to Valparaiso (see Chart 38, and Diagrams 20 and 21). STATION 297.

November 11, 1875 ; lat. 37° 29′ S., long. 83° 7′ W.
Temperature of air at noon, 57°·3 ; mean for the day, 55°·9.
Temperature of water :—

	°		°
Surface, ...	57·0	500 fathoms, . . .	39·1
25 fathoms, . . .	55·5	600 „ . . .	38·2
50 „ . . .	53·7	700 „ . . .	37·4
75 „ . . .	51·9	800 „ . . .	36·7
100 „ . . .	50·1	900 „ . . .	36·5
125 „ . . .	48·4	1000 „ . . .	36·4
150 „ . . .	47·0	1100 „ . . .	36·3
175 „ . . .	45·7	1200 „ . . .	36·2
200 „ . . .	44·5	1300 „ . . .	36·1
225 „ . . .	43·8	1400 „ . . .	36·0
250 „ . . .	43·1	1500 „ . . .	35·9
275 „ . . .	42·5	1600 „ . . .	35·8
300 „ . . .	41·9	1700 „ . . .	35·6
400 „ . . .	40·4	Bottom, . . .	35·5

Density at 60° F. :—

Surface, ...	1·02542	300 fathoms, . . .	1·02533
25 fathoms, . . .	1·02529	400 „ . . .	1·02532
50 „	1·02526	800 „ . . .	1·02539
100 „ . . .	1·02518	1300 „ . . .	1·02554
200 „ . . .	1·02536	Bottom, . . .	1·02565

Depth, 1775 fathoms ; deposit, Globigerina Ooze, containing 71·15 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5 A.M. stopped and sounded in 1775 fathoms ; the sounding-tube brought up no trace of the bottom. Put trawl over, veering 2300 fathoms. Obtained serial temperatures from surface to bottom. Lowered whaler with naturalist, who shot a number of birds. At 1 P.M. commenced heaving in trawl, which came up fouled at 3.15 P.M., but containing

Station 297. a small Sponge, and about four litres of manganese nodules, while about three litres of nodules were obtained in the tow-net attached to the trawl, along with a quantity of Globigerina Ooze. The yellowish brown colour of this deposit is due to the presence of manganese and iron, and, like the deposit at Station 292, it contained abundance of volcanic ashes. In the examination of a large quantity of the deposit Mr. Murray recognised only two or three Radiolaria and a few siliceous spicules. The association of manganese nodules here in a Globigerina Ooze with a considerable quantity of basic volcanic glass, fine areolar volcanic ash, and palagonitic grains, deserves special mention; indeed, this association of altered basic volcanic material and manganese is very constant in deep-sea deposits. While there were perfect casts of Foraminifera observed in the nuclei of many of the nodules, no casts of these organisms were found in the deposit itself. The accumulation of free silica in these nuclei is very remarkable, especially when the small proportion of siliceous organisms in the deposit is remembered. One of the tow-nets contained several rounded lumps of the deposit, loosely held together by dendritic depositions of manganese and iron, which seemed to indicate the beginning of the nodule formation. Proceeded under steam. Seven Mother Carey's chickens and three albatrosses (*Diomedea exulans*) were shot, and prions, mutton birds, and another petrel were seen, but birds were on the whole rare, a single one or occasionally two coming along at intervals.

Juan Fernandez distant at noon, 302 miles. Made good 88 miles. Amount of current 3 miles, direction S. 39° W.

Animal from Trawl. The following species is recorded from the trawl at this Station :—

Tetractinellida (Sollas, Zool. pt. 63).

Thenea sp. (possibly young of *Thenea wrightii*, n.sp.).

Organisms from Surface-Nets. Surface Organisms.—The following species are recorded from the surface and deep tow-nets at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Spongocore puella, Haeckel.
Chiastolus amphicopium, Haeckel.
Phormocampe conus, Haeckel.
Castanella thomsoni, Haeckel.
Castanidium wildi, Haeckel.

Amphipoda (Stebbing, Zool. pt. 67).

Pardaliscoides tenellus, n.g., n.sp.
Cleonardo longipes, n.g., n.sp.
Lanceola sp. (?).

Pteropoda (Pelseneer, Zool. pt. 58).

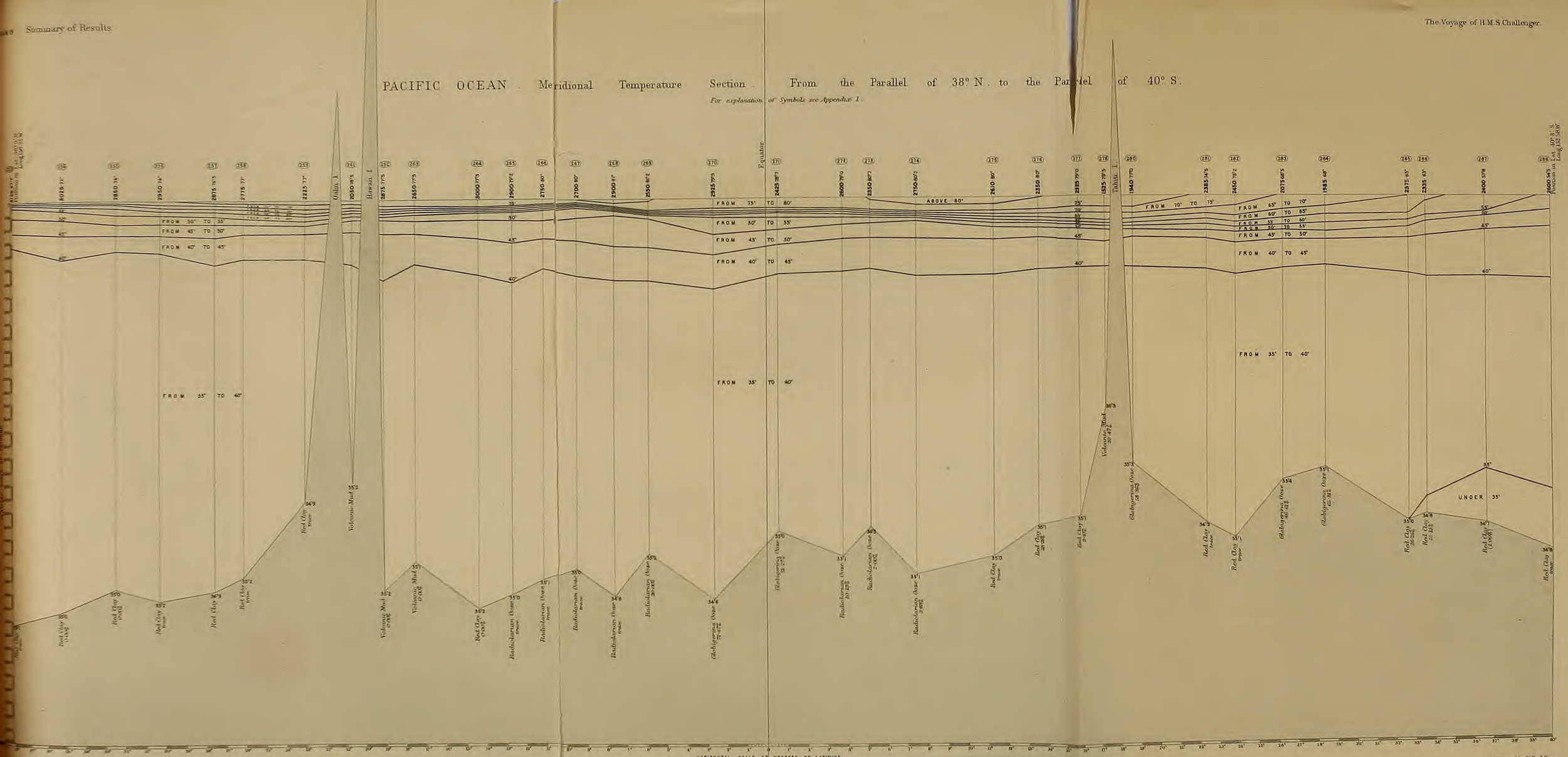
Dexiobranchæa polycotyla, Boas, (larvæ).

Cephalopoda (Hoyle, Zool. pt. 44).

Tracheloteuthis (?) sp.

PACIFIC OCEAN. Meridional Temperature Section. From the Parallel of 38° N. to the Parallel of 40° S.

For explanation of Symbols see Appendix 1.



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In addition, the following are recorded in the note-books:—*Globigerina*, *Hastigerina*, Siphonophoræ, Ctenophoræ (*Beroë*), *Sagitta*, *Tomopteris*, *Cypridina*, Copepods, *Oxycephalus*, Pteropods and larvæ, *Fritillaria*, *Appendicularia*, *Doliolum*, *Salpa*, &c. A tow-net sent down to 200 fathoms contained some Challengeridæ and other Radiolaria, and a tow-net at the trawl brought up some deep-sea Crustacea and Phæodaria. Station 297.

The Challenger anchored off the Fort in Cumberland Bay, Juan Fernandez, at 6.30 P.M. on November 13, and sailed at 6 P.M. on November 15 (for description of the island see *Narr. Chall. Exp.*, vol. i. pp. 810–830). The following species are recorded as having been obtained during the visit to Juan Fernandez :— At Juan Fernandez.

Amphipoda (Stebbing, Zool. pt. 67).

Orchestia selkirki, n.sp. Fifty-two specimens (shore); obtained at no other locality. Animals from Juan Fernandez.

Fishes (Günther, Zool. pt. 6).

Acanthias blainvilli, Risso. Obtained at no other locality by the Challenger. Recorded from Mediterranean and southern hemisphere.

Polyprion kneri, Steindachner. Obtained at no other locality by the Challenger.

Scorpæna thomsoni, n.sp. Obtained at no other locality.

Chilodactyla monodactylus, Carmichael. Obtained at no other locality by the Challenger.

Caranx georgianus, C.V. Obtained at no other locality by the Challenger.

Trigla picta, n.sp. Obtained at no other locality.

Umbrina reedi, n.sp. Obtained at no other locality.

Muræna porphyrea, Guichen. Obtained at no other locality by the Challenger.

Surface Organisms.—The water in the bay was phosphorescent, and the tow-net procured a great many specimens of *Ceratium* (*Peridinium*) *tripos*, along with many Radiolaria, a few *Globigerinæ*, *Appendicularia*, *Salpa*, &c. From the ship many large Crustaceans, belonging to the genus *Palinurus*, were taken by sinking a net with bait, and a great many fishes were taken both from the ship and off Cod Point. Organisms from Surface-Nets.

Station 298 (Sounding 443), Tahiti to Valparaiso (see Chart 38 and Diagram 21). Station 298.

November 17, 1875; lat. 34° 7′ S., long. 73° 56′ W.

Temperature of air at noon, 61°·8; mean for the day, 59°·3.

Station 298.

Temperature of water :—

	°		°
Surface,	59·0	700 fathoms,	38·1
25 fathoms,	55·8	800 „	37·7
50 „	52·5	900 „	37·2
75 „	50·5	1000 „	36·9
100 „	49·6	1100 „	36·7
125 „	48·3	1200 „	36·5
150 „	47·2	1300 „	36·3
175 „	46·1	1400 „	36·2
200 „	45·1	1500 „	36·1
225 „	44·1	1600 „	36·0
250 „	43·2	1700 „	35·9
275 „	42·4	1800 „	35·9
300 „	41·9	1900 „	35·8
400 „	40·3	2000 „	35·7
500 „	39·5	2100 „	35·7
600 „	38·7	Bottom,	35·6

Density at 60° F. :—

Surface,	1·02533	300 fathoms,	1·02529
25 fathoms,	1·02526	400 „	1·02540
50 „	1·02522	800 „	1·02544
100 „	1·02546	1725 „	1·02540
200 „	1·02540		

Depth, 2225 fathoms; deposit, Blue Mud, containing 5·65 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. shortened and furled sails, and proceeded under steam. Sounded in 2225 fathoms. Put trawl over, veering 2700 fathoms. Obtained serial temperatures from surface to bottom. The carbonic acid was determined in bottom water and amounted to 44·3 milligrammes per litre. At 1 P.M. commenced heaving in trawl, which came up at 3.40 P.M. with numerous specimens, while the attached tow-nets contained a little mud, one manganese nodule, portions of a Cephalopod beak, and pieces of twigs. The mud contained many excreta of Echinoderms. Proceeded under steam, and at 5.30 P.M. made sail. Many stormy petrels were seen.

Valparaiso distant at noon, 122 miles. Made good 122 miles. Amount of current 15 miles, direction S. 16° W.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Asteroidea (Sladen, Zool. pt. 51).

Porcellanaster gracilis, n.g., n.sp. Obtained at no other locality.

Hymenaster carnosus, n.sp. Obtained at no other locality. [Recorded in error from Station 295].

OPHIUROIDEA (Lyman, Zool. pt. 14). STATION 298.

Ophiacantha sentosa, n.sp. Two specimens ; obtained at no other locality.

„ *cosmica*, n.sp. Three specimens ; for distribution see Station 122.

ECHINOIDEA (Agassiz, Zool. pt. 9).

Aspidodiadema microtuberculatum, n.g., n.sp. Obtained also at Stations 122, 124, 134, and 299.

Pourtalesia carinata, n.sp. Obtained also at Stations 147 and 157.

„ *ceratopyga*, n.sp. Obtained also at Stations 157 and 299.

Cystechinus vesica, n.g., n.sp. Obtained also at Stations 153 and 299.

HOLOTHURIOIDEA (Théel, Zool. pts. 13 and 39).

Parelpidia cylindrica, n.g., n.sp. One specimen; obtained at no other locality. The only other species of the genus (*Parelpidia elongata*) was taken at Station 299.

Psychropotes longicauda, n.g., n.sp. One specimen ; obtained also at Stations 156 and 157.

Benthodytes sanguinolenta, n.g., n.sp. Three specimens ; obtained at no other locality. [Recorded in error from Station 295].

„ *abyssicola*, n.g., n.sp. Several specimens ; obtained at no other locality.

„ *sordida*, n.g., n.sp. One specimen ; obtained also at Stations 156, 157, and 158.

„ *mamillifera*, n.g., n.sp. One specimen ; obtained also at Station 299, 2160 fathoms. [Recorded in error from Station 295].

Cucumaria abyssorum, n.sp., var. *grandis*, nov. Two specimens ; the species obtained also at Stations 147, 156, 299, and 300. [Recorded in error from Station 295].

Pælopatides confundens, n.g., n.sp. Three specimens ; obtained also at Stations 299 and 300, 2160 and 1375 fathoms.

Holothurian (closely resembling *Pseudostichopus villosus*, n.g., n.sp.). One specimen ; obtained also at Station 299, 2160 fathoms.

ANNELIDA (M'Intosh, Zool. pt. 34).

Lumbriconereis abyssorum, n.sp. One specimen ; obtained at no other locality.

Nothria pycnobranchiata, n.sp. Several specimens ; obtained also at Station 299, 2160 fathoms.

„ *ehlersi*, n.sp. Several specimens ; obtained also at Station 299, 2160 fathoms.

Maldanella valparaisiensis, n.g., n.sp. One specimen ; obtained at no other locality.

Station 298.

Samythopsis grubei, n.g., n.sp. Several specimens; obtained at no other locality. Only species of the genus.

Eupista darwini, n.g., n.sp. Several specimens; obtained also at Station 63 (var.). The only other species of the genus (*Eupista grubei*) was taken at Station 325.

Macrura (Spence Bate, Zool. pt. 52).

Willemœsia leptodactyla (Willemoes-Suhm), n.g., n.sp. Two specimens; obtained also at Stations 13, 133, and 300.

Pycnogonida (Hoek, Zool. pt. 10).

Nymphon longicollum, n.sp. One specimen; obtained at no other locality.

Colossendeis media, n.sp. Two specimens; obtained at no other locality.

Cephalopoda (Hoyle, Zool. pt. 44).

Cirroteuthis magna, n.sp. One specimen; obtained also at Station 146.

Eledone rotunda, n.sp. One specimen; obtained also at Station 157.

In addition to the foregoing, the following are recorded in the Station-book:—Two specimens of an Esperid, and another Sponge, *Stephanoscyphus* on nodule, Sipunculid, *Arcturus*, and *Boltenia* (?).

Excluding Protozoa, nearly 100 specimens of invertebrates were obtained at this Station, belonging to about 33 species, of which 26 (all those reported) are new to science, including representatives of 11 new genera; 9 of the new species and 1 new genus were not obtained elsewhere.

Organisms from the Deposit.

The following species of Radiolaria and Diatoms were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

Radiolaria (Haeckel, Zool. pt. 40).

Streblacantha siderolina, Haeckel.
Triastrocyclus triaxonius, Haeckel.
Tympaniscus quadrupes, Haeckel.
Dictyospyris carpocanium, Haeckel.
Phormobotrys polythalamia, Haeckel.
Tripilidium hemisphæricum, Haeckel.
Euscenium tripospyris, Haeckel.
Litharachnium pilidium, Haeckel.
Lamprotripa furcata, Haeckel.
Sethophormis dodecaster, Haeckel.
Plectopyramis serrata, Haeckel.
Acanthocorys macroceras, Haeckel.
Lamprocyclas hajadera, Haeckel.
Stichopera clavata, Haeckel.
Cyrtopera laguncula, Haeckel.
Cyrtophormis turricula, Haeckel.
Lithostrobus pentastichus, Haeckel.
Autographis pulvinata, Haeckel.
Aulospathis trifurca, Haeckel.
Aulosphæra spathillata, Haeckel.
Auloscena serrata, Haeckel.
Aulonia pentagonia, Haeckel.
Challengeron diodon, Haeckel.
Circoporus octahedrus, Haeckel.
Circostephanus coronarius, Haeckel.

DIATOMACEÆ.—The following species were observed by Mr. Comber. STATION 298.

Grammatophora macilenta, Smith.
„ *undulata*, Ehrenberg.
Coscinodiscus lineatus, Ehrenberg.
„ *excentricus*, Ehrenberg.
„ *minor*, Ehrenberg.
„ *curvatulus*, Grunow.
„ *subtilis*, Ehrenberg.
„ *marginatus*, Ehrenberg.
„ *radiatus*, Ehrenberg.
„ *oculus-iridis*, Ehrenberg.
„ *obscurus*, A. Schmidt.
Coscinodiscus biangulatus, A. Schmidt.
„ *janischii*, A. Schmidt.
„ „ var. *arafurensis*, Grunow.
„ *apiculatus*, Ehrenberg, var. *woodwardii*.
„ *concinnus*, Smith.
„ sp. (?).
Paralia sulcata, Cleve.
Melosira mediterranea, Grunow, var. *punctulata*, Brun.
Actinoptychus areolatus, A. Schmidt.
„ *undulatus*, Ehrenberg.
Hemidiscus cuneiformis, Wallich.

Surface Organisms.— The following species are recorded from the surface in the vicinity of this Station :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Acrosphæra echinoides, Haeckel.
Spongocore puella, Haeckel.
Dicranastrum trifarium, Haeckel.
Sphærocapsa pavimentata, Haeckel.
Castanella thomsoni, Haeckel.

COPEPODA (Brady, Zool. pt. 23).

Centropages brachiatus, Dana.

SCHIZOPODA (Sars, Zool. pt. 37).

Euphausia mucronata, n.sp.
Siriella thompsoni (M.-Edwards).
Euchætomera tenuis, n.g., n.sp.

TUNICATA (Herdman, Zool. pt. 76).

Salpa democratica - mucronata, Forskål.

In addition, the following are recorded in the note-books from the tow-nets at the surface and down to 200 fathoms :—*Peridinium* (*tripos* and other species), *Globigerina* and other small Foraminifera, Acanthometræ and Challengeridæ, Infusoria, Medusæ, *Agalmopsis* and other Siphonophoræ, Ctenophoræ, *Sagitta*, *Alciopa*, *Tomopteris*, Aphroditacean and other Annelid larvæ, *Cypridina*, Copepods, *Mysis*, Crustacean larvæ, Pteropods and larvæ, larval Polyzoa (*Membranipora*), *Appendicularia*, small fishes and fish eggs. The tow-net at the weights contained Foraminifera, Challengeridæ and other Radiolaria, &c. The surface water was full of small Infusorial organisms (Tintinnidæ), and two or three bladder-like organisms were noticed, which were probably collapsed *Noctilucæ*. The deep-blue colour of the water observed for a long time past gave place to a green colour, and on the whole there was a great change in the general character of the surface fauna, pointing to the nearness of a great continent, similar to what was observed off Japan and elsewhere. On November 18, the water was very green in colour, and the ship occasionally passed through large red or brown patches, which the tow-net showed to be due to immense numbers of red Copepods, Hyperids, and other Crustacea.

At Valparaiso.

The Challenger remained at Valparaiso from November 19 till December 11, 1875 (see *Narr. Chall. Exp.*, vol. i. pp. 842-843). The deposit off Valparaiso in 41 fathoms was a Blue Mud, containing only a trace of carbonate of lime. The following species are recorded in the Zoological Reports as having been obtained during the stay :—

Animals from Valparaiso.

Asteroidea (Sladen, Zool. pt 51).

Stichaster aurantiacus (Meyen), Verrill. (Shore); obtained at no other locality by the Challenger. Recorded from Chili and Peru.

Heliaster helianthus (Lamarck), Dujardin and Hupé. (Shallow water); obtained at no other locality by the Challenger. Recorded from Ecuador, Chili, and Peru.

Echinoidea (Agassiz, Zool. pt. 9).

Arbacia nigra (Molin). Obtained at no other locality by the Challenger.

Anomura (Henderson, Zool. pt. 69).

Petrolisthes violaceus (Guérin). Four specimens (beach); obtained at no other locality by the Challenger. Recorded from Chilian coast.

,, *validus* (Dana). Several specimens (beach); obtained also in Messier Channel. Recorded from Valparaiso (?).

Brachyura (Miers, Zool. pt. 49).

Cancer longipes, Bell. Two specimens (shore); obtained at no other locality by the Challenger.

Acanthocyclus gayi, M.-Edwards and Lucas. Two specimens (beach); obtained also in Messier Channel. Recorded from Chili, Patagonia, and Magellan Strait.

Leptograpsus variegatus (Fabricius). One specimen (shore); obtained at no other locality by the Challenger. A widely-distributed species.

Gasteropoda (Watson, Zool. pt. 42).

Fissurella crassa, Lamarck. (Shore); obtained at no other locality by the Challenger. Recorded from Chili.

,, *maxima*, Sowerby. (Shore); obtained at no other locality by the Challenger. Recorded from Chili, Peru, and Rio Janiero.

Trochus (*Chlorostoma*) *ater*, Lesson. (Shore); obtained at no other locality by the Challenger. Recorded from Chili, Bolivia, and Magellan Strait.

Litorina peruviana (Lamarck). (Shore); obtained at no other locality by the Challenger. Recorded from Chili and Peru.

POLYPLACOPHORA (Haddon, Zool. pt. 43). VALPARAISO.

Chiton murrayi, n.sp. (Shore); obtained at no other locality.

FISHES (Günther, Zool. pt. 6).

Haplodactylus punctatus, C.V. Obtained at no other locality by the Challenger.
Thyrsites atun, Euphrasen. Obtained at no other locality by the Challenger.
Trachurus trachurus, Linné. Obtained also at Japan.
Latilus jugularis, C.V. Obtained at no other locality by the Challenger.
Porichthys porosus, C.V. Obtained at no other locality by the Challenger.
Clinus microcirrhis, C.V. Obtained at no other locality by the Challenger.
Atherinichthys brevianalis, n.sp. Obtained at no other locality.
Genypterus chilensis, Guich. Obtained at no other locality by the Challenger.
Merluccius gayi, Guich. Obtained also in Messier Channel.
Clupea sagax, Jen. Obtained at no other locality by the Challenger.
Ophichthys dicellurus, Rich. Obtained at no other locality by the Challenger.
Bdellostoma polytrema, Girard. Obtained at no other locality by the Challenger.

In the foregoing list 25 species are enumerated, of which 2 are new to science, and were not obtained elsewhere.

Surface Organisms.—The following species are recorded from the surface in the vicinity of Valparaiso:— ORGANISMS FROM SURFACE-NETS.

COPEPODA (Brady, Zool. pt. 23).

Calanus propinquus, n.sp.
,, *gracilis*, Dana.
Eucalanus attenuatus (Dana).
Undina darwinii, Lubbock.
Drepanopus furcatus, n.g., n.sp.
Corycæus pellucidus, Dana.
Oncæa obtusa, Dana.

The tow-nets on December 11 and 12 gave large quantities of small blue *Salpæ*, along with Diatoms, *Globigerina*, *Orbulina*, Acanthometræ, Infusoria, &c. Whales and porpoises were seen; two whales were observed to cross the mouth of Valparaiso Harbour in company, the smaller one of which came to the surface at intervals of about two hundred yards and rose right out of the water, sometimes exposing fully two-thirds of its body, when it gave a half turn and fell usually on its back or side, making a tremendous splash; this it did about half a dozen times, mostly in the same manner.

Station 299 (Sounding 444), Valparaiso to Gulf of Peñas (see Chart 40 and Diagram 21). STATION 299.

December 14, 1875; lat. 33° 31′ S., long. 74° 43′ W.
Temperature of air at noon, 63°·8; mean for the day, 60°·8.

STATION 299.

Temperature of water :—

	°		°
Surface,	62·0	400 fathoms,	40·6
25 fathoms,	59·0	500 „	39·3
50 „	53·1	600 „	38·5
75 „	50·9	700 „	37·7
100 „	49·1	800 „	37·0
125 „	47·8	900 „	36·6
150 „	46·5	1000 „	36·3
175 „	45·3	1100 „	36·0
200 „	44·4	1200 „	35·8
225 „	43·5	1300 „	35·6
250 „	42·8	1400 „	35·4
275 „	42·1	1500 „	35·2
300 „	41·7	Bottom,	35·2

Density at 60° F.:—

Surface,	1·02529	200 fathoms,	1·02547
25 fathoms,	1·02539	300 „	1·02545
50 „	1·02530	400 „	1·02543
100 „	1·02539	Bottom,	1·02567

Depth, 2160 fathoms; deposit, Blue Mud, containing 15·40 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Shortened and furled sails. Put trawl over and veered 2700 fathoms. At 6.30 A.M. sounded in 2160 fathoms. The sounding-tube brought up a section of about four inches, the uppermost inch being of a red colour containing no calcareous organisms, while the lower portion was a blue-grey compact mud with several manganese grains and pieces of pumice. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 50 fathoms, 300 fathoms, and bottom, and amounted respectively to 41·0, 42·9, and 44·4 milligrammes per litre. At 1 P.M. commenced heaving in trawl, which came up at 3.15 P.M. with numerous specimens, over a quart of manganese nodules and fragments of pumice, a piece of granite, small hardened concretions of the bottom, fragment of Cephalopod beak, and some mud; one of the tow-nets at the trawl was half full of mud. At 3.30 P.M. made sail. Later in the evening observed several phosphorescent patches. *Diomedea exulans*, black albatrosses, stinkers, prions, petrels, and Thalassidromas were seen.

Cape Tres Montes distant at noon, 807 miles. Made good 17 miles. Amount of current 15 miles, direction N. 57° E.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Station 299
Animals from Trawl.

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Tedania actiniiformis, n.sp. Three specimens; obtained at no other locality.

Trichostemma irregularis, n.sp. Two specimens; obtained at no other locality.

Actiniaria (Hertwig, Zool. pts. 15 and 73).

Corallimorphus rigidus, Moseley, n.g., n.sp. One specimen; obtained also at Stations 146 and 195.

Ophiodiscus annulatus, n.g., n.sp. Four specimens; obtained at no other locality. The only other species of the genus (*Ophiodiscus sulcatus*) was taken at Station 300.

Polyopis striata, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Aulorchis paradoxa, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Epizoanthus thalamophilus, n.sp. Colony of seventeen individuals on *Fusus* shell; obtained at no other locality.

Palythoa (?) sp. One specimen.

Actinian. One specimen adhering to *Dentalium* shell.

Corals (Moseley, Zool. pt. 7).

Bathyactis symmetrica (Pourtalès). Two specimens; for distribution see Station 24.

Leptopenus hypocælus, n.g., n.sp. One specimen; obtained at no other locality. The only other species of the genus (*Leptopenus discus*) was taken at Stations 147, 157, and 323.

Deep-Sea Medusæ (Haeckel, Zool. pt. 12).

Tesserantha connectens, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Leonura terminalis, n.sp. One specimen; obtained at no other locality.

Asteroidea (Sladen, Zool. pt. 51).

Hyphalaster diadematus, n.g., n.sp. Several specimens; obtained at no other locality.

Marsipaster hirsutus, n.g., n.sp. Obtained at no other locality. Recorded subsequently from Indian Ocean ("Investigator").

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha lacazei, n.sp. Several specimens; obtained also at Station 160.

Station 299.

Ophiomusium armigerum, n.sp. (?). Several specimens; obtained also at Stations 83, 106, and 332.

Amphilepis patens, n.sp. Obtained at no other locality.

Ophiacantha cosmica, n.sp. Several specimens; for distribution see Station 122.

Echinoidea (Agassiz, Zool. pt. 9).

Aspidodiadema microtuberculatum, n.g., n.sp. Obtained also at Stations 122, 124, 134, and 298.

Phormosoma asterias, n.sp. Obtained at no other locality.

Pourtalesia ceratopyga, n.sp. Four specimens; obtained also at Stations 157 and 298.

Cystechinus vesica, n.g., n.sp. Obtained also at Stations 153 and 298.

„ *wyvillii*, n.g., n.sp. Obtained also at Stations 146, 147, 158, 296, and 300.

Holothurioidea (Théel, Zool. pts. 13 and 39).

Parelpidia elongata, n.g., n.sp. One specimen; obtained at no other locality. The only other species of the genus (*Parelpidia cylindrica*) was taken at Station 298.

Elpidia verrucosa, n.sp. One specimen; obtained at no other locality.

Scotoplanes globosa, n.g., n.sp. About thirty specimens; obtained also at Station 157.

Oneirophanta mutabilis, n.g., n.sp. Several specimens; obtained also at Stations 146, 157, 160, 241, 244, 281, and 325. Only species of the genus.

Benthodytes mamillifera, n.g., n.sp. Eight specimens; obtained also at Station 298.

Trochostoma sp. (?). One specimen.

Cucumaria abyssorum, n.sp., var. *grandis*, nov. Eight specimens; the species obtained also at Stations 147, 156, 298, and 300.

Pelopatides confundens, n.g., n.sp. One specimen; obtained also at Stations 298 and 300.

Holothurian (closely resembling *Pseudostichopus villosus*, n.g., n.sp.). Obtained also at Station 298.

Annelida (M'Intosh, Zool. pt. 34).

Eunoa opalina, n.sp. One specimen (eyeless variety); obtained also at Station 311, 245 fathoms.

Nothria pycnobranchiata, n.sp. Several specimens; obtained also at Station 298.

„ *chlersi*, n.sp. Several specimens; obtained also at Station 298.

Euthelepus chilensis, n.g., n.sp. Several specimens; obtained at no other locality.

CIRRIPEDIA (Hoek, Zool. pt. 25). STATION 299.

Scalpellum darwinii, n.sp. One specimen (attached to manganese nodule); obtained at no other locality.

PYCNOGONIDA (Hoek, Zool. pt. 10).

Nymphon procerum, n.sp. One specimen; obtained at no other locality.

SCAPHOPODA (Watson, Zool. pt. 42).

Dentalium keras, n.sp. One specimen; obtained also at Station 246. Recorded subsequently from North Atlantic ("Blake").

POLYZOA (Busk, Zool. pt. 30).

Menipea pateriformis, n.sp. Obtained at no other locality.
Bugula reticulata, n.sp. Obtained also at Stations 147, 303, and 320.
Kinetoskias pocillum, n.sp. Obtained also at Station 122.
Flustra biseriata, n.sp. Obtained also at Station 196.

BRACHIOPODA (Davidson, Zool. pt. 1).

Terebratula wyvillii, n.sp. Two specimens; obtained also at Stations 160, 184, 244, 302, and 317.
Waldheimia wyvillii, n.sp. One specimen; obtained at no other locality.

TUNICATA (Herdman, Zool. pts. 17 and 76).

Corynascidia suhmi, n.g., n.sp. One specimen; obtained also at Station 146. Only species of the genus.
Octacnemus bythius, Moseley, n.g., n.sp. One specimen; obtained also at Station 218. Only species of the genus.

FISHES (Günther, Zool. pt. 57).

Macrurus filicauda, n.sp. One specimen; obtained also at Stations 146, 157, 158, 323, and 325.

In addition to the foregoing, the following are recorded in the Station-book :—Several specimens of *Stephanoscyphus*, Hydroid, several *Serpulæ*, *Arcturus* (?), *Fusus* with *Epizoanthus*, several specimens of *Discina*, and single valve of *Pleuronectia* (?). The Polyzoa, *Discina*, *Stephanoscyphus*, and *Serpulæ* were attached both to the manganese nodules and to the Holothurians.

Station 299.

Excluding Protozoa, over 200 specimens of invertebrates and fishes were obtained at this Station, belonging to about 61 species, of which 45 are new to science, including representatives of 19 new genera; 20 of the new species and 3 new genera were not obtained elsewhere.

Organisms from the Deposit.

The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 65 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina irregularis, d'Orbigny.
Hyperammina ramosa, Brady.
Rhabdammina discreta, Brady.
Rhizammina algæformis, Brady.
Reophax difflugiformis, Brady.
,, *distans*, Brady.
,, *nodulosa*, Brady.
Haplophragmium agglutinans (d'Orbigny).
,, *anceps*, Brady.
,, *canariense* (d'Orbigny).
,, *globigeriniforme* (Parker and Jones).
,, *glomeratum*, Brady.
Placopsilina bulla, Brady.
Hormosina globulifera, Brady.
Ammodiscus gordialis (Jones and Parker).
Trochammina pauciloculata, Brady.
Lagena formosa, Schwager.[1]
Nodosaria (*Glandulina*) *æqualis*, Reuss.
× *Globigerina bulloides*, d'Orbigny.
× *Orbulina universa*, d'Orbigny.
× *Sphæroidina dehiscens*, Parker and Jones.
Discorbina bertheloti (d'Orbigny).
Truncatulina lobatula (Walker and Jacob).
,, *pygmæa*, Hantken.
Anomalina grosserugosa (Gümbel).
× *Pulvinulina micheliniana* (d'Orbigny).

Radiolaria (Haeckel, Zool. pt. 40).

Cyrtophormis turrita, Haeckel.
Auloyraphis trisena, Haeckel.
,, *tripentas*, Haeckel.
Aulospathis trifurca, Haeckel.
Aulonia pentagonia, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the tow-nets at the surface and down to 200 fathoms in the vicinity of this Station:—

Radiolaria (Haeckel, Zool. pt. 40).

Elaphococcus umbellatus, Haeckel.
Pityomma drymodes, Haeckel.
Cromyodrymus abietinus, Haeckel.
Spongocore puella, Haeckel.
Polyplagia duodenaria, Haeckel.

Copepoda (Brady, Zool. pt. 23).

Calanus valgus, n.sp.
Drepanopus furcatus, n.g., n.sp.
Saphirina inæqualis, Dana.
Saphirina splendens, Dana.
,, *gemma*, Dana.

Macrura (Spence Bate, Zool. pt. 52).

Sergestes nasidentatus, n.sp.

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *virgula* (Rang).

Tunicata (Herdman, Zool. pt. 76).

Doliolum krohni, n.sp.
Salpa democratica - mucronata, Forskål.

In addition, the following are recorded in the note-books :—*Peridinium* (*tripos* and two other species), Diatoms, green circular Algæ (*Halosphæra* ?), small bladder-like organisms (*Noctiluca* ?), Coccospheres, *Globigerina*, *Orbulina*, *Pulvinulina*, Acanthometræ, Polycystinæ, Challengeridæ, and compound Radiolaria, Infusoria, Medusæ, Siphonophoræ, *Sagitta*, *Tomopteris*, Aphroditacean larvæ, Planarian larvæ, *Cypridina*, Hyperids and other Amphipods, *Euphausia*, Heteropods, Pteropods and larvæ, larvæ of *Membranipora*, *Appendicularia*. A hump-back whale followed the ship for over an hour, coursing round the ship several times, and turning on its back and side frequently when it came to the surface ; there were bunches of Cirripeds at the blow-holes, on the dorsal fin, and on some parts of the pectoral fins. On the 15th *Globigerinæ* were exceedingly abundant in the surface-nets, and the pseudopodia were observed ramifying between the calcareous spines, and projecting beyond the tips of the latter, as well as forming the bubble-like expansions of the float. In the sarcode surrounding the *Pulvinulinæ* were numerous small Diatoms, *Peridinium*, Coccospheres, and Infusoria. Station 299.

Station 300 (Sounding 445), Valparaiso to Gulf of Peñas (see Chart 40 and Diagram 21). Station 300.

December 17, 1875 ; lat. 33° 42′ S., long. 78° 18′ W.

Temperature of air at noon, 62°·8 ; mean for the day, 61°·3.

Temperature of water :—

	°		°
Surface,	62·5	300 fathoms,	41·3
25 fathoms,	57·8	400 „	40·1
50 „	53·7	500 „	39·4
75 „	51·2	600 „	38·7
100 „	49·5	700 „	38·0
125 „	47·8	800 „	37·4
150 „	46·3	900 „	36·9
175 „	45·3	1000 „	36·4
200 „	44·1	1100 „	35·9
225 „	43·4	1200 „	35·7
250 „	42·6	Bottom,	35·5
275 „	42·0		

Density at 60° F.:—

Surface,	1·02526	300 fathoms,	1·02535
25 fathoms,	1·02509	400 „	1·02532
50 „	1·02512	800 „	1·02552
100 „	1·02520	1350 „	1·02563
200 „	1·02541	Bottom,	1·02543

Depth, 1375 fathoms ; deposit, Globigerina Ooze, containing 54·09 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Station 300.

At 4.20 A.M. observed the island of Juan Fernandez in the west. At 4.30 A.M. shortened and furled sails, and got up steam. At 5.15 A.M. put trawl over and veered 2700 fathoms. At 6.30 A.M. brought ship to wind and sounded in 1375 fathoms. Obtained serial temperatures down to bottom. The carbonic acid was determined in water from 50 fathoms and the bottom, and amounted respectively to 50·4 and 49·3 milligrammes per litre. At 1 P.M. commenced heaving in trawl, which came up at 4.25 P.M. with numerous specimens and a considerable quantity of ooze, in which were several small basaltic pebbles with a slight coating of manganese, and flat pieces of hardened tufa of a red colour with a thick coating of manganese. At 4.30 P.M. proceeded under steam and sail. Juan Fernandez in sight the whole afternoon. *Diomedea exulans*, *Diomedea melanophrys* (?), *Procellaria maxima*, mutton birds, petrels, *Prion turtur*, and *Thalassidroma* were seen.

Juan Fernandez (East Pt.) distant at noon, 23 miles. Made good 74 miles. Amount of current 16 miles, direction N. 45° W.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Hexactinellida (Schulze, Zool. pt. 53).

Hyalonema poculum, n.sp. One specimen ; obtained at no other locality.

Actiniaria (Hertwig, Zool. pt. 15).

Corallimorphus profundus, Moseley, n.g., n.sp. One specimen ; obtained also at Station 293.

Paractis excavata, n.sp. One specimen ; obtained at no other locality.

Ophiodiscus sulcatus, n.g., n.sp. One specimen ; obtained at no other locality. The only other species of the genus (*Ophiodiscus annulatus*) was taken at Station 299.

Asteroidea (Sladen, Zool. pt. 51).

Dytaster exilis, n.g., n.sp. Obtained also at Station 133 (var. *gracilis*).

Hymenaster vicarius, n.sp. Two specimens ; obtained at no other locality.

,, *porosissimus*, n.sp. Two specimens ; obtained at no other locality.

Echinoidea (Agassiz, Zool. pt. 9).

Pharmosoma hoplacantha, Wyville Thomson, n.sp. Obtained also at Stations 164B and 235.

Cystechinus wyvillii, n.g., n.sp. Three specimens ; obtained also at Stations 146, 147, 158, 296, and 299.

HOLOTHURIOIDEA (Théel, Zool. pts. 13 and 39). STATION 300.

Lætmogone wyville-thomsoni, n.g., n.sp. A great many specimens ; obtained also at Stations 147, 158, and 232.

Euphronides depressa, n.g., n.sp. Two specimens; obtained also at Station V. Only species of the genus.

Benthodytes papillifera, n.g., n.sp. Five specimens ; obtained also at Stations 184 and 271.

Cucumaria abyssorum, n.sp., var. *hyalina*, nov. Two specimens ; the species obtained also at Stations 147, 156, 298, and 299.

Pælopatides confundens, n.g., n.sp. Six specimens ; obtained also at Stations 298 and 299.

Stichopus (?) *torvus*, n.sp. One specimen ; obtained at no other locality.

Holothuria murrayi, n.sp. Two specimens ; obtained at no other locality.

OSTRACODA (Brady, Zool. pt. 3).

Bairdia hirsuta, n.sp. Obtained also at Station 296.

Cythere stolonifera, n.sp. Obtained also at the Cape.

„ *sulcato-perforata*, n.sp. Obtained at no other locality.

„ *dictyon*, n.sp. For distribution see Station 24.

„ *dasyderma*, n.sp. For distribution see Station 5.

„ *scutigera*, Brady. For distribution see Station 167.

Krithe producta, n.sp. For distribution see Station 70.

Xestoleberis curta, Brady. For distribution see Station 33.

Cytheropteron mucronalatum, n.sp. For distribution see Station 70.

MACRURA (Spence Bate, Zool. pt. 52).

Pentacheles lævis, n.g., n.sp. One specimen ; obtained also at Station 214.

Willemœsia leptodactyla (Willemoes-Suhm), n.g., n.sp. Three specimens ; obtained also at Stations 13, 133, and 298.

Sergestes profundus, n.sp. One specimen ; obtained also at Station 137.

Glyphocrangon rimapes, n.sp. Two specimens ; obtained also at Stations 237 and 331.

Nematocarcinus proximatus, n.sp. Three specimens ; obtained also at Stations 146, 188, 237, and 302.

ANOMURA (Henderson, Zool. pt. 69).

Parapagurus abyssorum, M.-Edwards, MS. Many specimens ; for distribution see Station 56.

Munidopsis antonii (M.-Edwards, MS.). One specimen ; obtained also at Station 158.

Galacantha bellis, n.sp. Six specimens ; obtained at no other locality.

Station 300.

Pycnogonida (Hoek, Zool. pt. 10).

Colossendeis gigas, n.sp. Several specimens; obtained also at Stations 146 and 147.
,, *leptorhynchus*, n.sp. Several specimens; obtained also at Stations 146, 147, and 310.

Lamellibranchiata (Smith, Zool. pt. 35).

Arca (*Barbatia*) *corpulenta*, n.sp. Obtained also at Stations 184, 194, 198, 216, and 271.

Brachiopoda (Davidson, Zool. pt. 1).

Discina atlantica, King. For distribution see Station 186.

Fishes (Günther, Zool. pt. 57).

Macrurus fernandezianus, n.sp. One specimen; obtained at no other locality.
Chlorophthalmus gracilis, n.sp. Three specimens; obtained also at Stations 168 and 335.

In addition to the foregoing, the following are recorded in the Station-book:—Fragments of *Farrea facunda* (?), *Stephanoscyphus*, many Actinians of four or five different species (only three species given above), many specimens of a compound Actinian on *Margarita* shells inhabited by Pagurids, several Medusæ (one $4\frac{1}{2}$ inches in diameter), Pennatulid (with short conical base and a single pair of enormously large laterally-placed polyps), fragments of arms of *Brisinga*, several specimens of *Ophiolepis*, two Aphroditaceans, dead shells of *Margarita* (?) with Pagurids, and single arm of a Cephalopod. The stomachs of several of the shrimps were examined, and contained half-digested fragments of red-coloured Crustaceans, as well as fragments of *Globigerinæ* and mineral particles, all of which seemed to indicate that these animals fed on the bottom.

Excluding Protozoa, nearly 200 specimens of invertebrates and fishes were obtained at this Station, belonging to about 52 species, of which 34 are new to science, including representatives of 10 new genera; 10 of the new species were not obtained elsewhere.

Organisms from the Deposit.

The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 83 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
,, ,, var. *murrhyna*, Schwager.
,, ,, ,, *serrata*, Brady.
,, *ringens* (Lamarck).
Biloculina sphæra, d'Orbigny.
Spiroloculina tenuis (Czjzek).
Miliolina seminulum (Linné).
,, *tricarinata* (d'Orbigny).

Planispirina contraria (d'Orbigny).
Cornuspira involvens, Reuss.
„ sp. (?).
Pelosina sp. (?).
Saccammina sphærica, Sars (?).
Hyperammina elongata, Brady.
„ *ramosa*, Brady.
„ *subnodosa*, Brady.
Marsipella cylindrica, Brady.
Rhabdammina discreta, Brady.
Aschemonella catenata (Norman) (?).
Rhizammina algæformis, Brady.
Reophax adunca, Brady.
„ *dentaliniformis*, Brady.
„ *difflugiformis*, Brady.
„ *distans*, Brady.
Haplophragmium agglutinans (d'Orbigny).
„ *fontinense*, Terquem.
„ *globigeriniforme* (Parker and Jones).
„ *latidorsatum* (Bornemann).
„ *rotulatum*, Brady.
Thurammina papillata, Brady.
Hormosina carpenteri, Brady.
„ *globulifera*, Brady.
„ *normani*, Brady.
Trochammina pauciloculata, Brady.
Webbina clavata, Jones and Parker.
Textularia agglutinans, d'Orbigny.
„ *concava* (Karrer).
„ *quadrilatera*, Schwager.
„ sp (?).
Verneuilina pygmæa (Egger).
Bigenerina capreolus (d'Orbigny).
„ *robusta*, Brady.
Gaudryina pupoides, d'Orbigny.
„ „ var. *chilostoma*, Reuss.
Valvulina conica, Parker and Jones.
Clavulina communis, d'Orbigny.
Bulimina buchiana, d'Orbigny.
„ *elegantissima*, d'Orbigny, var. *seminuda*, Terquem.
„ *inflata*, Seguenza.
„ *marginata*, d'Orbigny.
„ *ovata*, d'Orbigny.
„ *pupoides*, d'Orbigny.
„ *pyrula*, d'Orbigny.
Virgulina schreibersiana, Czjzek.
„ *subdepressa*, Brady.
„ *subsquamosa*, Egger.
Virgulina texturata, Brady. STATION 300.
Bolivina decussata, Brady.
„ *punctata*, d'Orbigny.
„ *textilarioides*, Reuss (?).
Cassidulina crassa, d'Orbigny.
„ *subglobosa*, Brady.
Ehrenbergina serrata, Reuss.
Lagena aspera, Reuss.
„ *desmopleura*, Rymer Jones.
„ *formosa*, Schwager.
„ *globosa* (Montagu).
„ *gracilis*, Williamson.
„ *hispida*, Reuss.
„ *lævis* (Montagu).
„ *lineata* (Williamson).
„ *longispina*, Brady.
„ *marginata* (Walker and Boys).
„ *orbignyana* (Seguenza).
„ *seminiformis*, Schwager.
„ *seminuda*, Brady.
„ *striata* (d'Orbigny).
„ *sulcata* (Walker and Jacob).
„ *torquata*, Brady.
„ *trigono-marginata*, Parker and Jones.
„ *truncata*, Brady.
„ sp. (?).
Nodosaria communis, d'Orbigny.
„ *consobrina*, d'Orbigny.
„ *farcimen* (Soldani).
„ *hispida*, d'Orbigny, var. *sublineata*, Brady.
„ *inflexa*, Reuss.
„ (*Glandulina*) *lævigata*, d'Orbigny.
„ *mucronata*, Neugeboren.
„ *plebeia* (Reuss).
„ *raphanus* (Linné).
„ *verruculosa*, Neugeboren.
„ sp. (?).
Marginulina glabra, d'Orbigny.
Cristellaria convergens, Bornemann.
„ *crepidula* (Fichtel and Moll).
Polymorphina angusta, Egger.
„ *longicollis*, Brady.
Uvigerina aculeata, d'Orbigny.
„ *angulosa*, Williamson.
„ „ var. *spinipes*, Brady.
„ *asperula*, Czjzek.
„ „ var. *ampullacea*, Brady.
„ *brunnensis*, Karrer (?).
„ *canariensis*, d'Orbigny.
„ *interrupta*, Brady.

Station 300.

Uvigerina pygmæa, d'Orbigny.
„ sp. (?).
Sagrina virgula, Brady.
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ „ var. *triloba*, Reuss.
× „ *digitata*, Brady.
× „ *dubia*, Egger.
× „ *helicina*, d'Orbigny.
× „ *inflata*, d'Orbigny.
× *Orbulina universa*, d'Orbigny.
Pullenia quinqueloba, Reuss.
„ *sphæroides* (d'Orbigny).
Sphæroidina bulloides, d'Orbigny.
× „ *dehiscens*, Parker and Jones.
× *Candeina nitida*, d'Orbigny.
Spirillina limbata, Brady.
Truncatulina lobatula (Walker and Jacob).
Truncatulina tenera, Brady.
„ *ungeriana* (d'Orbigny).
„ *wuellerstorfi* (Schwager).
Anomalina grosserugosa (Gümbel).
Rupertia stabilis, Wallich.
× *Pulvinulina canariensis* (d'Orbigny).
× „ *crassa* (d'Orbigny).
„ *favus*, Brady.
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
× „ *patagonica* (d'Orbigny).
„ *pauperata*, Parker and Jones.
„ *umbonata*, Reuss.
Rotalia orbicularis, d'Orbigny.
„ *soldanii*, d'Orbigny.
Nonionina scapha (Fichtel and Moll).
„ *umbilicatula* (Montagu).

Radiolaria (Haeckel, Zool. pt. 40).

Hexastylus cleobuli, Haeckel.
Hexalonche aspera, Haeckel.
Hexacromyum arachnoides, Haeckel.
Ellipsostylus oricularis, Haeckel.
Pipettaria fusaria, Haeckel.
Trochodiscus solaris, Haeckel.
Periphæna statoblastus, Haeckel.
Phacostaurus quadrigatus, Haeckel.
Archidiscus hexathalamus, Haeckel.
Stauralastrum dilatatum, Haeckel.
Spongotripus irregularis, Haeckel.
Larcarium staurostylum, Haeckel.
Octopyle subglobosa, Haeckel.
Amphitholus acanthometra, Haeckel.
Zemiscus hexatholius, Haeckel.
Stauracantha johannis, Haeckel.
Lithocircus quadricornis, Haeckel.
Semantis sigillum, Haeckel.
Zygostephanus bicornis, Haeckel.
Tympanidium foliosum, Haeckel.
Parastephanus dispar, Haeckel.
Eutympanium dolecarium, Haeckel.
Petalospyris furcata, Haeckel.
Archipera quadricornis, Haeckel.
Cystophormis tabulata, Haeckel.
Cornutanna cyrtoconus, Haeckel.
Dictyophimus longipes, Haeckel.
Arachnocorys polyptera, Haeckel.
Carpocanium lanceolatum, Haeckel.
Sethophæna tetraptera, Haeckel.
Sethoconus lophophæna, Haeckel.
„ *bimarginatus*, Haeckel.
Podocyrtis favosa, Haeckel.
Calocyclas hyalogaster, Haeckel.
Artopilium trigonopterum, Haeckel.
Cyrtopera lagenella, Haeckel.
Stichophormis radiata, Haeckel.
Artophormis horrida, Haeckel.
Artophæna hexalatractus, Haeckel.
Stichophæna ritteriana, Haeckel.
Aulographis candelabrum, Haeckel.
Aulospathis trifurca, Haeckel.
Aulonia pentagonia, Haeckel.
Challengeria havergalli, Murray.
Cœlodrymus ancoratus, Haeckel.
Cœlotholus octonus, Haeckel.

Station 301

Station 301 (Sounding 446), Valparaiso to Gulf of Peñas (see Chart 40).

December 22, 1875; lat. 37° 29′ S., long. 84° 2′ W.

Temperature of air at noon, 60°·8; mean for the day, 56°·9.

Temperature of water :— STATION 301.

Surface,	59·5°	125 fathoms,	48·4°
25 fathoms,	57·4	150 „	46·5
50 „	55·2	175 „	45·2
75 „	52·8	200 „	44·2
100 „	50·5	300 „	42·0

Density at 60° F. :—

Surface,	1·02539	100 fathoms,	1·02517
25 fathoms,	1·02521	200 „	1·02521
50 „	1·02519	300 „	1·02521

Depth (1800 fathoms).

At 11.15 A.M. shortened and furled sails, proceeded under steam, and obtained temperatures down to 300 fathoms. At 1 P.M. completed temperatures and proceeded under steam and sail. *Diomedea exulans*, *Diomedea melanophrys* (?), *Procellaria maxima*, mutton birds, and Thalassidromas were seen.

Cape Tres Montes distant at noon, 684 miles; distance from Station 297, of November 11, 1875, 45 miles due E. Made good 40 miles. Amount of current 13 miles, direction N. 18° E.

Surface Organisms.—The tow-nets gave:—*Globigerina*, *Orbulina*, *Hastigerina*, Acanthometræ and other Radiolaria, Siphonophoræ, Copepods, *Salpæ*, &c. ORGANISMS FROM SURFACE-NETS.

Station 302 (Sounding 447), Valparaiso to Gulf of Peñas (see Chart 40 and Diagram 21). STATION 302.

December 28, 1875; lat. 42° 43′ S., long. 82° 11′ W.

Temperature of air at noon, 55°·8; mean for the day, 53°·5.

Temperature of water :—

Surface,	55·0°	300 fathoms,	41·1°
25 fathoms,	52·5	400 „	40·1
50 „	49·5	500 „	39·1
75 „	47·5	600 „	38·2
100 „	45·8	700 „	37·5
125 „	44·3	800 „	36·9
150 „	43·5	900 „	36·5
175 „	43·0	1000 „	36·2
200 „	42·5	1100 „	36·0
225 „	42·1	1200 „	35·9
250 „	41·8	1300 „	35·8
275 „	41·5	Bottom,	35·6

Station 302.

Density at 60° F. :—

Surface,	1·02531	300 fathoms,	1·02534
25 fathoms,	1·02504	400 „	1·02535
50 „	1·02514	800 „	1·02557
100 „	1·02522	950 „	1·02564
200 „	1·02538	Bottom,	1·02562

Depth, 1450 fathoms; deposit, Globigerina Ooze, containing 82·31 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4 A.M. shortened and furled sails, and proceeded under steam. At 6 A.M. sounded in 1450 fathoms. At 7 A.M. put trawl over and veered 2000 fathoms. Obtained serial temperatures down to bottom. The carbonic acid was determined in water from 200, 400, and 800 fathoms, and bottom, and amounted respectively to 47·3, 48·8, 53·2, and 55·6 milligrammes per litre. At 1 P.M. commenced heaving in trawl, which came up at 4.15 P.M. with numerous specimens, about a peck of the ooze, in which were numerous manganese nodules, some volcanic pebbles, and pieces of rock. At 4.30 P.M. made all plain sail. Molly mauks, stinkers (*Procellaria maxima*), mutton birds, and Cape pigeons were seen, and a molly mauk was shot, but a boat could not be lowered to pick it up.

Cape Tres Montes distant at noon 382 miles. Made good 100 miles. Amount of current 10 miles, direction W.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Tetractinellida (Sollas, Zool. pt. 63).

Thenea wrightii, n.sp. Six specimens; obtained at no other locality.

Echinoidea (Agassiz, Zool. pt. 9).

Urechinus naresianus, n.g., n.sp. Six specimens; obtained also at Stations 146, 147, and 158. Only species of the genus.

Holothurioidea (Théel, Zool. pts. 13 and 39).

Peniagone vitrea, n.g., n.sp. Several specimens; obtained at no other locality.

Pseudostichopus villosus, n.g., n.sp. One specimen; for distribution see Station 61.

Holothurian, (fragmentary specimen indeterminable).

Annelida (M'Intosh, Zool. pt. 34).

Vermilia (?) sp. One specimen.

Ostracoda (Brady, Zool. pt. 3). Station 302.

Cythere dictyon, n.sp. For distribution see Station 24.
,, *acanthoderma*, n.sp. For distribution see Station 64.
,, *dasyderma*, n.sp. For distribution see Station 5.
Krithe producta, n.sp. For distribution see Station 70.
Cytheropteron mucronalatum, n.sp. For distribution see Station 70.

Cirripedia (Hoek, Zool. pt. 25).

Scalpellum minutum, n.sp. Three specimens attached to a manganese nodule; obtained at no other locality.

Isopoda (Beddard, Zool. pt. 48).

Ischnosoma bacilloides, n.sp. One specimen; obtained at no other locality.
Acanthocope acutispina, n.g., n.sp. One specimen; obtained at no other locality.

Macrura (Spence Bate, Zool. pt. 52).

Nematocarcinus proximatus, n.sp. Three specimens; obtained also at Stations 146, 188, 237, and 300.

Anomura (Henderson, Zool. pt. 69).

Munidopsis subsquamosa, n.sp., var. *aculeata*, nov. One specimen; the species obtained also at Stations 146 and 237.

Lamellibranchiata (Smith, Zool. pt. 35).

Amussium meridionale, n.sp. Three specimens and single valves; obtained also at Stations 146 and 158.

Brachiopoda (Davidson, Zool. pt. 1).

Terebratula wyvillii, n.sp. Obtained also at Stations 160, 184, 244, 299, and 317.

In addition to the foregoing, the following are recorded in the Station-book:—Many specimens of *Stephanoscyphus* on manganese nodules, small Actinian attached to a manganese nodule and covered with Foraminifera, fragments of *Pourtalesia* (?), small fragments of Nemertine, several *Serpulæ* attached to manganese nodules, blind Amphipod with long slender body and limbs, and an empty Gasteropod shell.

Excluding Protozoa, nearly 100 specimens of invertebrates were obtained at this Station, belonging to about 25 species, of which 16 are new to science, including representatives of 4 new genera; 5 of the new species were not obtained elsewhere.

Station 302. Organisms from the Deposit.

The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :—

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 85 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
Spiroloculina tenuis (Czjzek).
Miliolina seminulum (Linné).
„ *venusta* (Karrer).
Haplophragmium latidorsatum (Bornemann).
Webbina clavata, Jones and Parker.
Gaudryina pupoides, d'Orbigny.
Bulimina buchiana, d'Orbigny.
Virgulina schreibersiana, Czjzek.
Bolivina decussata, Brady.
Cassidulina bradyi, Norman.
„ *crassa*, d'Orbigny.
„ *subglobosa*, Brady.
Lagena auriculata, Brady.
„ *botelliformis*, Brady.
„ *globosa* (Montagu).
„ *lævigata* (Reuss).
„ *marginata* (Walker and Boys).
„ *orbignyana* (Seguenza).
„ *seminiformis*, Schwager.
„ *seminuda*, Brady.
„ *staphyllearia* (Schwager).
Lagena sulcata (Walker and Jacob).
Nodosaria mucronata, Neugeboren.
Polymorphina sororia, Reuss.
Uvigerina asperula, Czjzek.
„ *pygmæa*, d'Orbigny.
× *Globigerina bulloides*, d'Orbigny.
× „ *dubia*, Egger.
× „ *inflata*, d'Orbigny.
× *Orbulina universa*, d'Orbigny.
Truncatulina pygmæa, Hantken.
„ *ungeriana* (d'Orbigny).
„ *wuellerstorfi* (Schwager).
× *Pulvinulina canariensis* (d'Orbigny).
„ *exigua*, Brady.
„ *favus*, Brady.
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
„ *partschiana* (d'Orbigny).
× „ *patagonica* (d'Orbigny).
„ *pauperata*, Parker and Jones.
Rotalia soldanii, d'Orbigny.
Nonionina umbilicatula (Montagu).

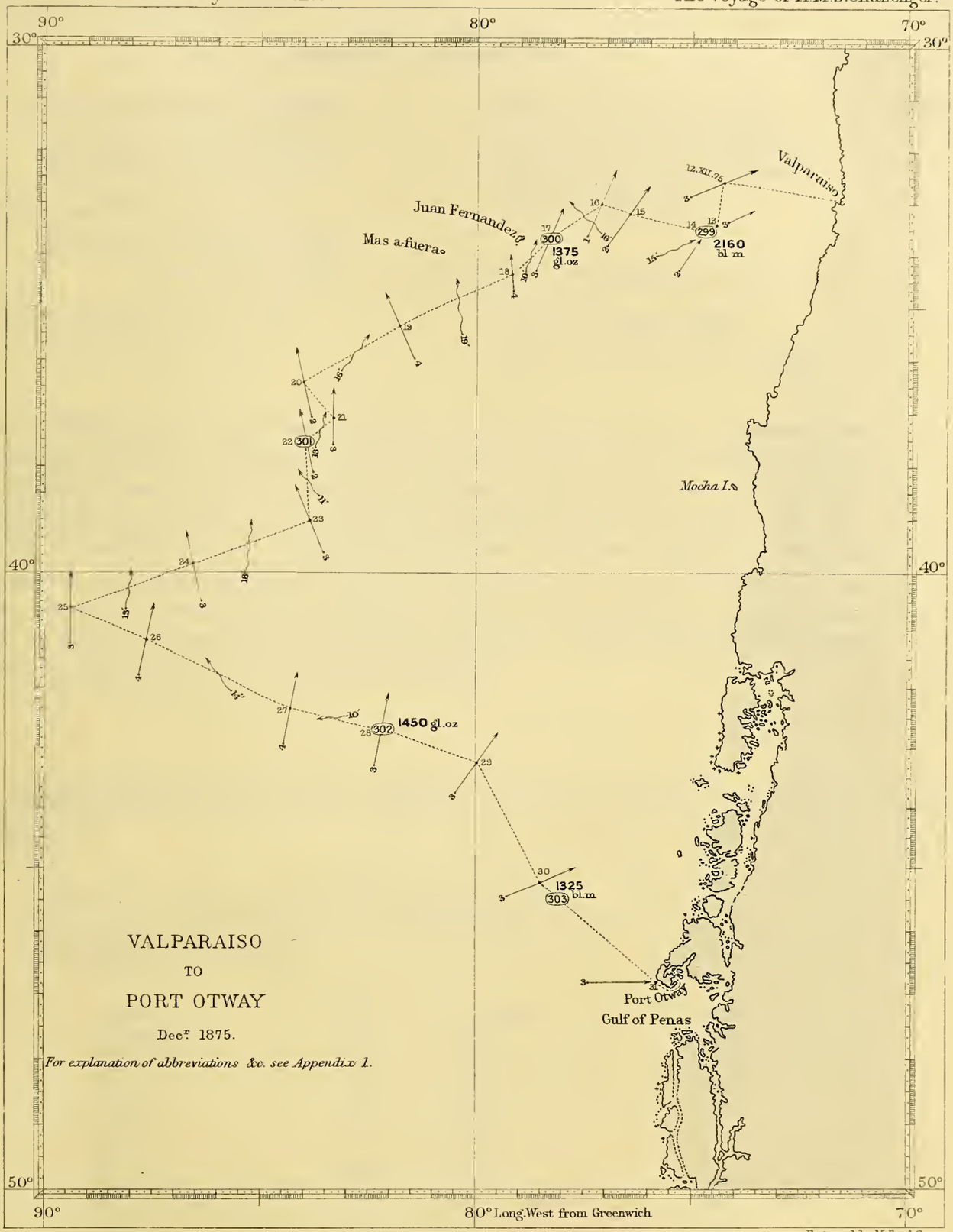
Radiolaria (Haeckel, Zool. pt. 40).

Xiphostylus falco, Haeckel.
Stylosphæra euterpe, Haeckel.
„ *thalia*, Haeckel.
Lithatractus rosetta, Haeckel.
Stomatodiscus amphistomus, Haeckel.
Amphitholonium tricolonium, Haeckel.
Lonchostaurus rhomboides, Haeckel.
Anthocyrtium campanula, Haeckel.
Eucyrtidium chrysalidium, Haeckel.
Aulographis flammabunda, Haeckel.
Aulonia pentagonia, Haeckel.

Organisms from Surface-Nets

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).
Thalassoxanthium triradiatum, Haeckel.
Rhaphidozoum patagonicum, Haeckel.
Haliomma patagonicum, Haeckel.
Astrosphæra hexagonalis, Haeckel.
Spongocore diplocylindrica, Haeckel.
„ *puella*, Haeckel.
Tholoma quadrigeminum, Haeckel.
Actinastrum pentazonium, Haeckel.



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NATURAL H

Lithoptera darwinii, Haeckel.
Dodecaspis tricinata, Haeckel.
Dorypelta ramosa, Haeckel.

Ostracoda (Brady, Zool. pt. 3).
Halocypris atlantica, Lubbock.
„ *brevirostris*, Dana.

Copepoda (Brady, Zool. pt. 23).
Calanus tonsus, n.sp.

Undina darwinii, Lubbock. Station 302.
Euchæta prestandreæ, Philippi.
Centropages violaceus (Claus).
Oncæa obtusa (Dana).

Amphipoda (Stebbing, Zool. pt. 67).

Podocerus validus (Dana).
Euthemisto gaudichaudii (Guérin).

In addition, the following are recorded in the note-books from the tow-nets at the surface and down to 60 fathoms :—Diatoms, *Ceratium* (*Peridinium*) *tripos*, Coccospheres and Rhabdospheres, *Globigerina*, *Orbulina*, *Pulvinulina*, Infusoria, Medusæ, Siphonophoræ, *Sagitta*, larvæ of Mysids and other Crustacea, *Appendicularia*, small fishes. The tow-net at the weights had not touched the bottom and contained a number of deep-sea organisms, including Polycystinæ, Phæodaria (*Challengeria*), and other Radiolaria, along with several very large *Sagittæ*, while the tow-nets at the trawl each contained some ooze, in which were some surface and deep-sea organisms. Schools of porpoises were seen about the ship, and one was struck but not captured.

Station 303 (Sounding 448), Valparaiso to Gulf of Peñas (see Chart 40 and Diagram 21). Station 303.

December 30, 1875 ; lat. 45° 31′ S., long. 78° 9′ W.
Temperature of air at noon, 53°·8 ; mean for the day, 53°·7.
Temperature of water :—

Surface,	54·8	300 fathoms,	40·8
25 fathoms,	51·4	400 „	39·8
50 „	48·5	500 „	39·0
75 „	46·4	600 „	38·1
100 „	44·9	700 „	37·4
125 „	43·9	800 „	36·8
150 „	43·1	900 „	36·4
175 „	42·5	1000 „	36·2
200 „	42·0	1100 „	36·0
225 „	41·6	1200 „	36·0
250 „	41·3	Bottom,	36·0
275 „	41·0		

Station 303.

Density at 60° F. :—

Surface,	1·02504	300 fathoms,	1·02535
25 fathoms,	1·02509	400 „	1·02533
50 „	1·02513	850 „	1·02557
100 „	1·02517	Bottom,	1·02563

Depth, 1325 fathoms; deposit, Blue Mud, containing 25·79 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 2.20 P.M. shortened and furled sails, and proceeded under steam. At 3.15 P.M. sounded in 1325 fathoms. Took serial temperatures down to the bottom. The carbonic acid was determined in water from the surface and 100 fathoms, and amounted respectively to 48·9 and 50·4 milligrammes per litre. At 5.40 P.M. completed observations and made all plain sail. *Diomedea exulans* and stormy petrels were seen.

Cape Gallegos distant at noon, 146 miles; Cape Tres Montes, 167 miles. Made good 135 miles. Amount of current 4 miles, direction N. 19° E.

The following species are recorded in error from this Station; they probably came from Station 308 (see Station 308).

Asteroidea (Sladen, Zool. pt. 51).
Ctenodiscus procurator, n.sp.
Mimaster cognatus, n.sp.
Lophaster stellans, n.sp.

Polyzoa (Busk, Zool. pt. 30).
Menipea benemunita, n.sp.
Menipea aculeata (d'Orbigny).
Bugula reticulata, n.sp.
Carbasea ovoidea, Busk.
Cribrilina monoceros (Busk).
Cellepora eatonensis, n.sp.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Ostracoda (Brady, Zool. pt. 3).
Halocypris atlantica, Lubbock.
„ *brevirostris*, Dana.

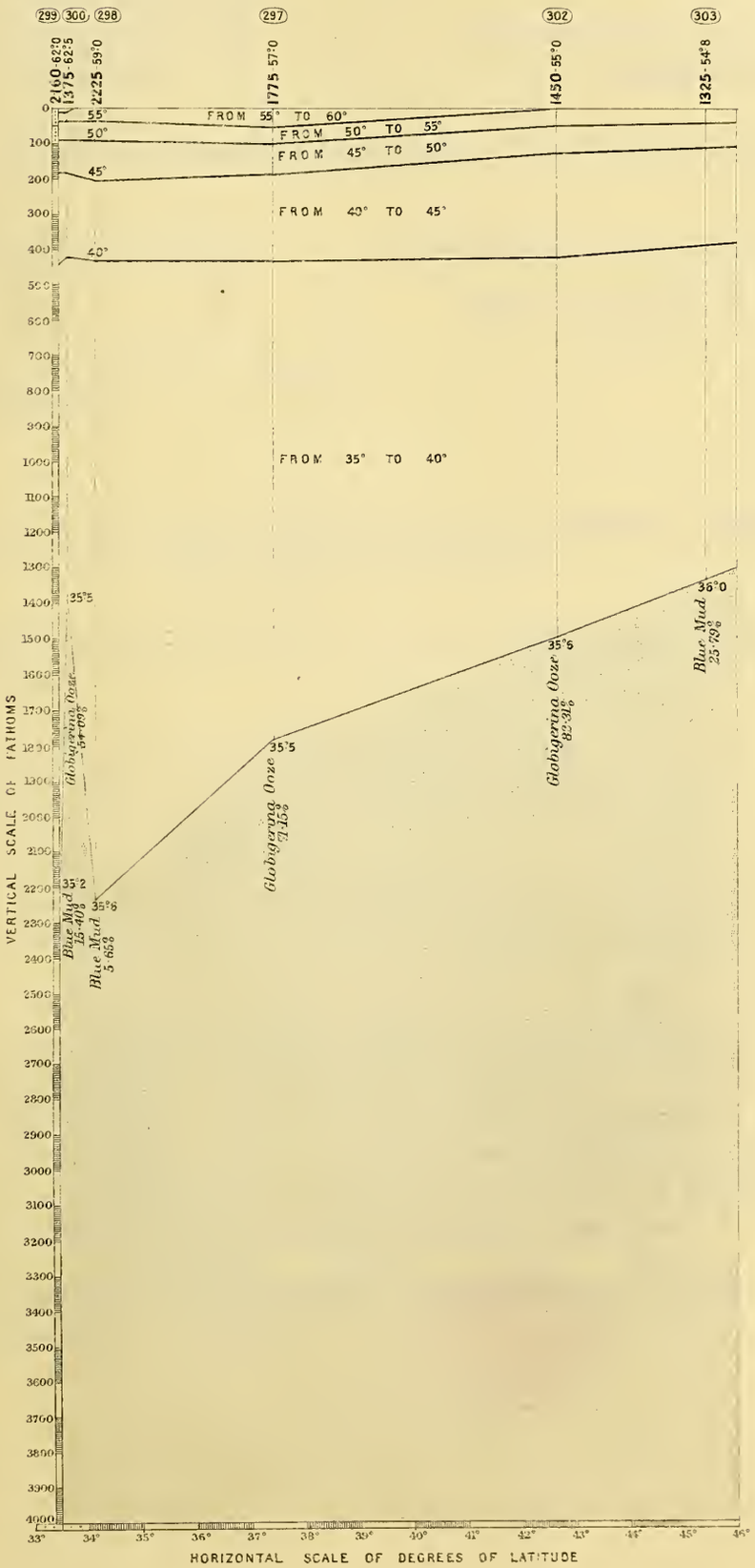
Copepoda (Brady, Zool. pt. 23).
Eucalanus attenuatus (Dana).
Oncæa obtusa (Dana).

In addition, the following are recorded in the note-books from the tow-nets at the surface and down to 30 fathoms :—*Peridinium tripos*, *Globigerina*, *Orbulina*, Acanthometræ and other Radiolaria, Siphonophoræ, *Sagitta*, *Tomopteris*, Hyperids and other Amphipods, *Euphausia*, Zoëæ, small Lamellibranchs, Heteropods, and Pteropods. A few porpoises were seen.

PACIFIC OCEAN

Meridional Temperature Section off the West coast of South America between the 33rd and 46th Parallels.

For explanation of Symbols see Appendix 1



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BRITISH MUSEUM
NATURAL HISTORY

The following species are recorded from the surface of the South Pacific, the exact locality not being noted :—

Macrura (Spence Bate, Zool. pt. 52).

Acanthosoma longitelsonis, n.sp.
Sergestes rinkii, Krøyer.
Sergestes junceus, n.sp.
,, *fermerinkii*, n.sp.

The following species are recorded from the surface of the Pacific, the precise locality not being noted :—

Amphipoda (Stebbing, Zool. pt. 67).
Vibilia, sp. (?).

Isopoda.
Two specimens, genera and species undetermined.

Macrura (Spence Bate, Zool. pt. 52).
Amphion reynaudii, M.-Edwards.
,, sp. (Zoëæ).

D. MAGELLAN STRAIT AND OTHER CHANNELS BETWEEN THE PACIFIC AND ATLANTIC OCEANS.

Station 304 (Sounding 449), Gulf of Peñas to Sandy Point through Magellan Strait (see Chart 41). Station 304.

December 31, 1875, lat. 46° 53′ 15″ S., long. 75° 12′ W.
Temperature of air at noon, 54°·8 ; mean for the day, 54°·2.
Temperature of water at surface, 57°·2.
Density at 60° F. at surface, 1·02295.
Depth, 45 fathoms ; deposit, Quartz Sand, containing 2·72 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

About 9 A.M. observed Cape Gallegos to the N.E. At 10.45 A.M. observed Cape Raper. About 2 P.M. rounded Cape Tres Montes. At 3 P.M. rounded Cape Stokes. At 3.15 P.M. stopped and sounded in 45 fathoms. Put dredge over. At 4.15 P.M. hauled up dredge and put trawl over. At 5 P.M. hove up trawl and proceeded for Port Otway. Many specimens were procured, most of them in the swabs attached to the dredge. At 6.30 P.M. stopped and anchored in the entrance to Port Otway in 13 fathoms. Landed exploring parties, who returned with botanical and zoological specimens.

The following species are recorded in the Zoological Reports from the dredge and trawl at this Station :—

Station 304. Animals from Dredge and Trawl.

Hydroida (Allman, Zool. pt. 70).

Sertularia operculata, Linné. Several specimens; obtained at no other locality by the Challenger. Recorded from European Seas.

Asteroidea (Sladen, Zool. pt. 51).

Porania magellanica, Studer. Several specimens; obtained at no other locality by the Challenger. Recorded from Magellan Strait.

Peribolaster folliculatus, n.g., n.sp. Obtained at no other locality. Only species of the genus.

Asterias (*Cosmasterias*) *tomidata*, n.sp. Several specimens; obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha lymani, Ljungman. Obtained also at Stations 305, 307, 308, 309, 311, and 313, 40 to 245 fathoms.

Echinoidea (Agassiz, Zool. pt. 9).

Arbacia dufresnii (Bl.). Four specimens; obtained also at Stations 135 and 308.

Strongylocentrotus gibbosus (Val.). Obtained at no other locality by the Challenger.

Echinus magellanicus, Phil. Four specimens; for distribution see Station 145.

Isopoda (Beddard, Zool. pt. 33).

Serolis schythei, Lütken. Many specimens; obtained also at Stations 313, 314, 315, and 316, 4 to 70 fathoms. Recorded from Patagonia and Falkland Islands.

Macrura (Spence Bate, Zool. pt. 52).

Nothocaris spiniserratus, n.g., n.sp. Eight specimens; obtained at no other locality

Anomura (Henderson, Zool. pt. 69).

Parapagurus abyssorum, M.-Edwards, MS. One specimen; for distribution see Station 56.

Munida subrugosa (White). Several specimens; for distribution see Station 162.

Brachyura (Miers, Zool. pt. 49).

Eurypodius latreillei, Guérin-Ménéville. One specimen; obtained also at Stations 312, 313, 314, 315, 316, and Falkland Islands, 4 to 70 fathoms. Recorded from E. and W. coasts of South America, Magellan Strait, and Falklands.

Libinia gracilipes, n.sp. Six specimens; obtained at no other locality.

Hypopeltarium spinosulum (White). One specimen; obtained also at Stations 315, 316, and Falkland Islands, 4 to 45 fathoms. Recorded from Chili, Patagonia, and Falklands. STATION 304.

PYCNOGONIDA (Hoek, Zool. pt. 10).

Phoxichilidium patagonicum, n.sp. One specimen; obtained also at Stations 308, 313, and 320 (var. *elegans*), 55 to 600 fathoms.

GASTEROPODA (Watson, Zool. pt. 42).

Trochus (*Margarita*) *illotus*, n.sp. One specimen; obtained at no other locality.

POLYZOA (Busk, Zool. pt. 30; Waters, pt. 79).

Ætea anguina (Linné). Obtained also at Stations 36, 135, 161, and 162.
Salicornaria clavata, n.sp. For distribution see Station 149. [Waters calls it *Cellaria australis*, MacGillivray].
,, *variabilis*, n.sp. Obtained also at Stations 149 and 314.
,, *malvinensis*, Busk. For distribution see Station 149.
Cellepora signata, n.sp. Obtained at no other locality.

In addition to the foregoing, the following are recorded in the Station-book:—Actinian (*Anthea* ?), *Tubularia* (large quantity), *Spirorbis*, very many Annelids in tubes with arborescent mouth (Sabellid), and *Caprella*.

Excluding Protozoa, over 150 specimens of invertebrates were obtained at this Station, belonging to about 27 species, of which 9 are new to science, including representatives of 2 new genera; 6 of the new species and 1 new genus were not obtained elsewhere.

Surface Organisms.—The following species are recorded from the surface at this Station:— ORGANISMS FROM SURFACE-NETS.

OSTRACODA (Brady, Zool. pt. 3).

Halocypris atlantica, Lubbock.

COPEPODA (Brady, Zool. pt. 23).

Pleuromma abdominale (Lubbock).
Calanoides patagoniensis, n.g., n.sp.
Centropages brachiatus (Dana).

In addition, the following are recorded in the note-books:—A few *Globigerinæ*, larvæ of *Squilla* and other minute Crustacea, small Lamellibranch shells.

Stations 305 to 305B

Stations 305 to 305B (Soundings 450 to 452), Gulf of Peñas to Sandy Point through Magellan Strait (see Chart 41).

January 1, 1876 ; lat. 47° 47′ to 47° 48′ 30″ S., long. 74° 47′ to 74° 46′ W.
Temperature of air at noon, 53°·8 ; mean for the day, 53°·3.
Temperature of water at surface, 55°·5.
Density at 60° F. at surface, 1·02251 ; bottom, 1·02519.
Depth, 165, 125, and 160 fathoms ; deposit, Blue Mud, containing about 4 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4 A.M. got up steam. At 5 A.M. weighed anchor and proceeded out of Port Otway ; shaped course for entrance of Messier Channel. At 1.30 P.M. shortened and furled sails. At 1.45 P.M. stopped and sounded in 165 fathoms (Station 305). Proceeded towards Penguin Island. At 3 P.M. stopped and sounded in 125 fathoms (Station 305A), and put trawl over. Sent surveying and exploring parties to Penguin Island. At 3.30 P.M. the trawl came up with many specimens. Sounded in 160 fathoms (Station 305B). At 4.30 P.M. surveying and exploring parties returned on board. Proceeded through Messier Channel to Hale Cove, anchoring there in 17 fathoms at 6.45 P.M. Exploring parties went on shore, and returned at 8 P.M.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl, which was sent down in 125 fathoms and came up from 160 fathoms :—

Actiniaria (Hertwig, Zool. pt. 73).

Liponema multiporum, n.g., n.sp. One specimen ; obtained also at Stations 147 and 237. Only species of the genus.

Corals (Moseley, Zool. pt. 7).

Flabellum patagonichum, n.sp. Very many specimens ; obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha lymani, Ljungman. Several specimens ; for distribution see Station 304.

Echinoidea (Agassiz, Zool. pt. 9).

Schizaster moseleyi, n.sp. Several specimens ; for distribution see Station 146.

Ostracoda (Brady, Zool. pt. 3).

Macrocypris similis, n.sp. Obtained also at Stations 120 and 344.

Bairdia amygdaloides, Brady. For distribution see Station 162.
,, *angulata*, Brady. For distribution see Station 75.
Cythere scalaris, n.sp. Obtained also at Station 185.
,, *dictyon*, n.sp. For distribution see Station 24.
,, *dasyderma*, n.sp. For distribution see Station 5.
Krithe producta, n.sp. For distribution see Station 70.
Cytherura cribrosa, n.sp. Obtained at no other locality.
Cytheropteron patagoniense, n.sp. Obtained at no other locality.
Cytherella punctata, Brady. For distribution see Station 135.

Macrura (Spence Bate, Zool. pt. 52).

Stereomastis suhmi, n.g., n.sp. One specimen; obtained also at Station 311, 245 fathoms. The only other species of the genus (*Stereomastis auriculata*) was taken at Station 174.
Campylonotus semistriatus, n.g., n.sp. Six specimens; obtained also at Stations 306, 307, 308, 309, 310, and 311, 40 to 400 fathoms.

Anomura (Henderson, Zool. pt. 69).

Munida subrugosa (White). Two specimens; for distribution see Station 304.

Lamellibranchiata (Smith, Zool. pt. 35).

Neæra patagonica, n.sp. Single valve; obtained at no other locality.

Gasteropoda (Watson, Zool. pt. 42).

Fusus (*Neptunea*) *scalaris*, n.sp. Obtained at no other locality.

Fishes (Günther, Zool. pt. 57).

Spinax granulosus, n.sp. One specimen; obtained at no other locality.
Lotella marginata, n.sp. Two specimens; obtained also at Stations 306, 307, and 308, 140 to 345 fathoms.
Macrurus fasciatus, n.sp. One specimen; obtained also at Stations 309 and 311, 40 to 245 fathoms.

In addition to the foregoing, the following are recorded in the Station-book:— Several specimens of *Asterogonium*, six specimens of *Ctenodiscus australis*, Annelid in arenaceous tube shaped like a *Dentalium* shell, another Annelid, and a *Dentalium*.

Excluding Protozoa, over 120 specimens of invertebrates and fishes were obtained at this Station, belonging to about 27 species, of which 17 are new to science, including representatives of 3 new genera; 6 of the new species were not obtained elsewhere.

Stations 305 to 305B. Organisms from Surface-Nets.

Surface Organisms.—The following species is recorded from the surface at this Station :—

Tunicata (Herdman, Zool. pt. 76).

Salpa cordiformis-zonaria, Quoy and Gaimard—Pallas.

The tow-nets procured Diatoms, *Sagitta*, numerous Annelid larvæ, Crustacea, and small Lamellibranchs.

Stations 306 and 306A.

Stations 306 and 306A (Soundings 453 and 454), Gulf of Peñas to Sandy Point through Magellan Strait (see Chart 41).

January 2, 1876 ; lat. 48° 17′ to 48° 27′ S., long. 74° 33′ to 74° 30′ W.
Temperature of air at noon, 61°·3 ; mean for the day, 56°·9.
Temperature of water :—

Surface,	57°·5	125 fathoms,	46°·0
25 fathoms,	49·3	150 „	46·0
50 „	47·2	175 „	46·0
75 „	46·8	200 „	46·0
100 „	46·2	Bottom (345 fathoms),	46·0

Density at 60° F. :—

Surface,	1·00480 1·01521	200 fathoms,	1·02512
100 fathoms,	1·02487	300 „	1·02503
		Bottom,	1·02515

Depth, 565 and 345 fathoms; deposit, Blue Mud, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4 A.M. got up steam, and at 5 A.M. weighed anchor and proceeded out of Hale Cove. At 9 A.M. stopped and sounded in 565 fathoms (Station 306), and at 9.20 A.M. proceeded. At 11.30 A.M. stopped opposite Middle Island, and landed surveying and exploring parties. Sounded in 345 fathoms (Station 306A). Put over trawl. Obtained serial temperatures down to 200 fathoms. The carbonic acid was determined in water from the bottom, and amounted to 45·1 milligrammes per litre. At 1.15 P.M. trawl came up with many specimens. At 2 P.M. surveying and exploring parties returned. Proceeded to sound through the Messier Channel. At 6.30 P.M. anchored in 17 fathoms in Gray's Harbour.

The following species are recorded in the Zoological Reports from the trawl at Station 306A :— Station 306A. Animals from Trawl.

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Myxilla cribrigera, n.sp. One specimen ; obtained at no other locality.

Corals (Moseley, Zool. pt. 7).

Desmophyllum ingens, n.sp. Numerous specimens ; obtained also at Stations 307, 308, and 311, 140 to 245 fathoms.

„ *eburneum*, n.sp. Several specimens ; obtained at no other locality.

Asteroidea (Sladen, Zool. pt. 51).

Ctenodiscus procurator, n.sp. Obtained also at Stations 307, 308, 309, and 311, 40 to 245 fathoms. [Recorded in error from 565 fathoms].

Asterias (*Cosmasterias*) *sulcifera* (Valenciennes, MS.), Perrier. Several specimens ; obtained at no other locality by the Challenger. Recorded from Chili.

Holothurioidea (Théel, Zool. pt. 39).

Trochostoma antarcticum, n.sp. One specimen ; obtained also at Station 307, 140 fathoms.

Stichopus moseleyi, n.sp. Four specimens ; obtained also at Stations 308 and 311, 175 and 245 fathoms.

Annelida (M'Intosh, Zool. pt. 34).

Leanira magellanica, n.sp. Two specimens ; obtained at no other locality.

Hemipodus (?) *magellanicus*, n.sp. Numerous specimens ; obtained also at Station 310, 400 fathoms.

Macrura (Spence Bate, Zool. pt. 52).

Campylonotus semistriatus, n.g., n.sp. Three specimens ; for distribution see Station 305.

Polyplacophora (Haddon, Zool. pt. 43).

Plaxiphora carmichaelis (Gray). Obtained at no other locality by the Challenger. Recorded from Australia, New Zealand, and southern portion of South America.

Station 306A. Fishes (Günther, Zool. pts. 6 and 57).

Sebastes oculatus, C.V. Several specimens; obtained also at Station 307, 147 fathoms.

Notothenia longipes, Steindachner. Obtained also at Stations 312 and 313, 10 to 55 fathoms.

Lotella marginata, n.sp. One specimen; obtained also at Stations 305, 307, and 308.

Catætyx messieri, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

In addition to the foregoing, the following are recorded in the Station-book :—Small Actinian attached to Corals, two small Urchins, Sipunculid, and a Lamellibranch.

Excluding Protozoa, nearly 100 specimens of invertebrates and fishes were obtained at this Station, belonging to about 19 species, of which 11 are new to science, including representatives of 2 new genera; 4 of the new species and 1 new genus were not obtained elsewhere.

Organisms from Surface-Nets. Surface Organisms.—The tow-nets procured many Diatoms, *Peridinium tripos*, Annelid larvæ, Copepods, Cirriped larvæ, Amphipods, larval Lamellibranchs (young mussels), and *Appendicularia*, but on the whole the tow-nets yielded very few organisms.

Station 307. **Station 307** (Sounding 455), Gulf of Peñas to Sandy Point through Magellan Strait (see Chart 41).

January 4, 1876; lat. 49° 24′ 30″ S., long. 74° 23′ 30″ W.
Temperature of air at noon, 61°·8; mean for the day, 56°·2.
Temperature of water at surface, 53°·0.
Density at 60° F. :—

Surface,	1·01508	16 fathoms,	1·02385
2½ fathoms,	1·00926	25 „	1·02405
5 „	1·01870	50 „	1·02450
7 „	1·01928	100 „	1·02469
10 „	1·02266	Bottom,	1·02465

Depth, 140 fathoms; deposit, Blue Mud, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.20 A.M. the steam pinnace left the ship with exploring party. At 10.30 A.M. weighed anchor and proceeded out of Gray's Harbour for the English Narrows. At

2.20 P.M. stopped and sounded in 140 fathoms off Saumarez Island. Put over trawl, which came up at 4.30 P.M. with numerous specimens and a quantity of stones and pebbles. Proceeded for Port Grappler, anchoring there at 5.40 P.M. in 8 fathoms. Pinnace returned with exploring party. STATION 307.

The following species are recorded in the Zoological Reports from the trawl at this Station :— ANIMALS FROM TRAWL.

MONAXONIDA (Ridley and Dendy, Zool. pt. 59).

Reniera aquæductus, Schmidt, var. *infundibularis*, nov. One specimen ; obtained also off S.W. Patagonia. The species recorded from Mediterranean and Australia.

„ *subglobosa*, n.sp. One specimen ; obtained at no other locality.

Myxilla nobilis, n.sp., var. *bacillifera*, nov. Two specimens ; the species obtained also at Stations 148, 311 (var. *patagonica*), and 320.

HEXACTINELLIDA (Schulze, Zool. pt. 53).

Bathydorus stellatus, n.g., n.sp. One specimen ; obtained at no other locality.

ALCYONARIA (Wright and Studer, Zool. pt. 64).

Dasygorgia flexilis, n.sp. Obtained at no other locality.

Acanella chiliensis, n.sp. Obtained at no other locality.

Plumarella delicatissima, n.sp. Obtained at no other locality.

Acanthogorgia ridleyi, n.sp. Three specimens ; obtained at no other locality.

Anthomuricea argentea, n.g., n.sp. Obtained at no other locality. Only species of the genus.

ACTINIARIA (Hertwig, Zool. pt. 15).

Phellia pectinata, n.sp. One specimen ; obtained at no other locality.

CORALS (Moseley, Zool. pt. 7).

Desmophyllum ingens, n.sp. Several specimens ; obtained also at Stations 306, 308, and 311.

ASTEROIDEA (Sladen, Zool. pt. 51).

Pseudarchaster discus, n.g., n.sp. Obtained at no other locality.

Ctenodiscus procurator, n.sp. Many specimens ; obtained also at Stations 306, 308, 309, and 311.

Station 307.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha lymani, Ljungman. Many specimens; for distribution see Station 304.

Ophiacantha sp. (?), (young).

Ophiolebes vestitus, n.g., n.sp. Obtained also at Stations 308 and 310, 175 and 400 fathoms.

Gorgonocephalus pourtalesii, Lyman. Three specimens; for distribution see Station 149.

Astrotoma agassizii, Lyman. Obtained also at Stations 148, 150, 308, 309, and 313.

Echinoidea (Agassiz, Zool. pt. 9).

Schizaster moseleyi, n.sp. Many specimens; for distribution see Station 146.

Holothurioidea (Théel, Zool. pt. 39).

Trochostoma antarcticum, n.sp. One specimen; obtained also at Station 306.

Psolus squamatus, Düben and Koren (var. ?). Two specimens; obtained also at Stations 308 and 311, 175 and 245 fathoms. Recorded from Europe and east coast of North America.

Annelida (M'Intosh, Zool. pt. 34).

Aphrodita echidna, Quatrefages (?). Obtained also at Station 309, 40 to 140 fathoms. Recorded from South America.

Macrura (Spence Bate, Zool. pt. 52).

Campylonotus semistriatus, n.g., n.sp. Forty specimens; for distribution see Station 305.

Lamellibranchiata (Smith, Zool. pt. 35).

Pecten vitreus (Chemnitz). Two specimens; for distribution see Station 204.

Fishes (Günther, Zool. pts. 6 and 57).

Sebastes oculatus, C.V. Several specimens; obtained also at Station 306.

Aphritis gobio, Günther. One specimen; obtained also at Stations 308 and 312, 10 to 175 fathoms.

Lotella marginata, n.sp. One specimen; obtained also at Stations 305, 306, and 308.

In addition to the foregoing, the following are recorded in the Station-book:—*Echinus*, several *Serpulæ*, Isopod parasitic on fish, *Doris* (?), Ascidian, and cluster of egg masses (?) with Sertularian Hydroid attached.

Excluding Protozoa, nearly 200 specimens of invertebrates and fishes were obtained at this Station, belonging to about 34 species, of which 18 are new to science, including representatives of 5 new genera; 9 of the new species and 1 new genus were not obtained elsewhere. STATION 307.

Station 308 (Sounding 456), Gulf of Peñas to Sandy Point through Magellan Strait (see Chart 41). STATION 308.

January 5, 1876 ; lat. 50° 8′ 30″ S., long. 74° 41′ W.
Temperature of air at noon, 48°·8 ; mean for the day, 48°·2.
Temperature of water at surface, 51°·7.
Density at 60° F. at surface, 1·01401.
Depth, 175 fathoms ; deposit Blue Mud, containing 28·84 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4 A.M. got up steam. At 4.45 A.M. weighed anchor and proceeded through Grappler and Icy Reaches for Wide Channel. At 2.30 P.M. stopped off N.E. end of Madre Island and sounded in 175 fathoms. Put over trawl, which came up at 4 P.M. with a rich collection of specimens, the bag and pockets being distended with large tangled masses of Gorgonoids, to which were attached Corals, Sponges, Euryalids, &c. Proceeded for Tom Bay, anchoring there in 17 fathoms at 5.15 P.M. Landed exploring parties.

The following species are recorded in the Zoological Reports from the trawl at this Station :— ANIMALS FROM TRAWL.

MONAXONIDA (Ridley and Dendy, Zool. pt. 59).

Tedania tenuicapitata, Ridley. Several specimens ; obtained also at Stations 311 and 314, 245 and 70 fathoms. Recorded from S.W. Patagonia.

Trachytedania patagonica, n.sp. One specimen ; obtained also at Station 311 (?), 245 fathoms.

Iophon pattersoni (Bowerbank). Several fragments ; obtained also at Stations 135 and 311.

Myxilla mollis, n.sp. Five specimens (Station 308 or 311, or both).

Station 308. Tetractinellida (Sollas, Zool. pt. 63).

Astrella vosmaeri, n.g., n.sp. Two specimens; obtained at no other locality. Only species of the genus.

Stelletta phrissens, n.sp. Several specimens; obtained at no other locality.

Cydonium magellani, n.sp. Several specimens; obtained also at Station 311, 245 fathoms.

Alcyonaria (Wright and Studer, Zool. pts. 64 and 81).

Thouarella köllikeri, n.sp. Two specimens; obtained also at Station 310, 400 fathoms.

Primnoella flagellum, Studer. Several specimens; obtained at no other locality by the Challenger. Recorded from Patagonia.

,, *biserialis*, n.sp. Obtained at no other locality.

Acanthogorgia laxa, n.sp. Obtained at no other locality.

Paramuricea ramosa, n.sp. Obtained at no other locality.

Eunicea palmata, n.sp. Obtained at no other locality.

Leptogorgia arbuscula (Philippi). One specimen; obtained at no other locality by the Challenger. Recorded from Chili.

Alcyonium haddoni, n.sp. Three specimens; obtained at no other locality.

Antipatharia (Brook, Zool. pt. 80).

Antipathella minor, n.g., n.sp. Obtained at no other locality.

,, (?) *speciosa*, n.g., n.sp. Obtained at no other locality.

,, *assimilis*, n.g., n.sp. Obtained at no other locality.

,, *contorta*, n.g., n.sp. Obtained at no other locality.

Corals (Moseley, Zool. pt. 7).

Caryophyllia clavus, Scacchi, var. *smithi*, Duncan (?). Several specimens; obtained also at Station 75.

Desmophyllum ingens, n.sp. Several specimens; obtained also at Stations 306, 307, and 311.

Crinoidea (Carpenter, Zool. pt. 60).

Antedon rhomboidea, n.sp. One specimen; obtained at no other locality.

Asteroidea (Sladen, Zool. pt. 51).

Ctenodiscus procurator, n.sp. Obtained also at Stations 306, 307, 309, and 311. [Recorded in error from Station 303].

Mimaster cognatus, n.sp. Obtained also at Station 311, 245 fathoms. [Recorded in error from Station 303]. Station 303.

Solaster regularis, n.sp. Obtained at no other locality.

Lophaster stellans, n.sp. Obtained also at Station 309, 40 to 140 fathoms. [Recorded in error from Station 303].

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha lymani, Ljungman. For distribution see Station 304.

Ophiactis asperula (Phil.). Obtained also at Stations 311, 312, and 315, 5 to 245 fathoms. Recorded from Patagonia and Chili.

Ophiacantha rosea, n.sp. Obtained also at Stations 145 and 236.

„ sp. (?).

Ophiolebes vestitus, n.g., n.sp. Obtained also at Stations 307 and 310.

Ophiomyxa vivipara, Studer. Obtained also at Stations 142, 313, and 314.

Gorgonocephalus pourtalesii, Lyman. For distribution see Station 149.

Astrotoma agassizii, Lyman. Obtained also at Stations 148, 150, 307, 309, and 313.

Ophiocreas carnosus, n.sp. Obtained at no other locality.

Echinoidea (Agassiz, Zool. pt. 9).

Arbacia dufresnii (Bl.). Obtained also at Stations 135 and 304.

Echinus horridus, n.sp. Several fragments ; obtained at no other locality.

„ *magellanicus*, Phil. For distribution see Station 145.

„ *margaritaceus*, Lamarck. For distribution see Station 149.

„ *norvegicus*, Düben and Koren. For distribution see Station 46.

Holothurioidea (Théel, Zool. pt. 39).

Psolus antarcticus, Philippi. Six specimens ; obtained also at Station 320, 600 fathoms. Recorded from Magellan Strait.

„ *squamatus*, Düben and Koren. Two specimens ; obtained also at Stations 307 and 311.

Stichopus moseleyi, n.sp. Two specimens ; obtained also at Stations 306 and 311.

Annelida (M'Intosh, Zool. pt. 34).

Lagisca magellanica, n.sp. Several specimens ; obtained also at Stations 145 (var. *grubei*), 149, and 310 (var. *murrayi*).

„ *darwini*, n.sp. Two specimens ; obtained at no other locality.

Eunice magellanica, n.sp. Many specimens ; obtained also at Stations 149 (young ?) and 311.

Serpula narconensis, Baird, var. *magellanica*, nov. Several specimens ; the species obtained also at Stations 144, 149, and 151.

Station 308.

Ostracoda (Brady, Zool. pt. 3).

Bairdia sp. (?).

Cythere patagoniensis, n.sp. Obtained at no other locality.

,, *dictyon*, n.sp. For distribution see Station 24.

Krithe producta, n.sp. For distribution see Station 70.

Cytherella sp. (?).

Macrura (Spence Bate, Zool. pt. 52).

Campylonotus semistriatus, n.g., n.sp. Nine specimens; for distribution see Station 305.

,, *vagans*, n.g., n.sp. One specimen; obtained at no other locality.

Anomura (Henderson, Zool. pt. 69).

Eupagurus comptus (White), var. *jugosa*, nov. Many specimens; obtained also at Station 315, 5 to 12 fathoms. The species recorded from Patagonia.

Brachyura (Miers, Zool. pt. 49).

Euripodius longirostris, n.sp. Two specimens; obtained at no other locality.

Pycnogonida (Hoek, Zool. pt. 10).

Phoxichilidium patagonicum, n.sp. One specimen; obtained also at Stations 304, 313, and 320 (var. *elegans*).

Lamellibranchiata (Smith, Zool. pt. 35).

Pecten vitreus (Chemnitz). For distribution see Station 204.

Gasteropoda (Watson, Zool. pt. 42).

Trophon liratus, Couthouy, MS. Obtained also at Station 315, 12 fathoms. Recorded from Falkland Islands and Oregon.

,, *acanthodes*, n.sp. Obtained also at Station 311, 245 fathoms.

Nudibranchiata (Bergh, Zool. pt. 26).

Tritonia challengeriana, n.sp. Two specimens; obtained at no other locality.

Polyzoa (Busk, Zool. pt. 30; Waters, pt. 79).

Menipea benemunita, n.sp. Obtained also at Stations 149, 313, 314, and 315. [Recorded in error from Station 303].

,, *aculeata* (d'Orbigny). Obtained also at Stations 314 and 315, 5 to 70 fathoms. Recorded from Patagonia and Kerguelen. [Recorded in error from Station 303].

Bugula reticulata, n.sp. Obtained also at Stations 147, 299, and 320. [Recorded in error from Station 303]. Station 308.

Carbasea ovoidea, Busk. For distribution see Station 144. [Recorded in error from Station 303].

Cribrilina monoceros (Busk). For distribution see Station 145. [Recorded in error from Station 303].

Cellepora eatonensis, n.sp. Obtained also at Stations 149 and 315. [Recorded in error from Station 303].

,, *armata*, Hincks, var. *erecta*, Waters, nov. Obtained at no other locality.

Tunicata (Herdman, Zool. pt. 38).

Leptoclinum tenue, n.sp. About two dozen specimens; obtained also at Stations 311 and 320, 245 and 600 fathoms. Recorded from North Atlantic ("Lightning").

Fishes (Günther, Zool. pts. 6 and 57).

Aphritis gobio, n.sp. Obtained also at Stations 307 and 312.

Lotella marginata, n.sp. Four specimens; obtained also at Stations 305, 306, and 307.

Macruronus novæ-zelandiæ (Hector). Obtained at no other locality by the Challenger. Recorded from New Zealand and Tasmania.

In addition to the foregoing, the following are recorded in the Station-book:—*Hyalonema* without stem, Actinian, and many Hydroids.

Excluding Protozoa, over 250 specimens of invertebrates and fishes were obtained at this Station, belonging to about 68 species, of which 42 are new to science, including representatives of 4 new genera; 21 of the new species and 1 new genus were not obtained elsewhere.

Organisms from the Deposit.

Foraminifera (Brady, Zool. pt. 22).—The following species of Foraminifera were observed in the deposits from Stations 308 and 309, 40 to 175 fathoms; in the former depth there was only a trace of carbonate of lime, while in the latter there was 28·84 per cent., the pelagic species (marked thus ×) making up about 21 per cent. of the carbonate of lime present:—

Biloculina depressa, d'Orbigny.
,, *ringens* (Lamarck).
,, *sphæra*, d'Orbigny.
Spiroloculina planulata (Lamarck).
Miliolina pygmæa (Reuss).
,, *seminulum* (Linné).
Planispirina celata (Costa).
Hyperammina ramosa, Brady.
Reophax scorpiurus, Montfort.
Haplophragmium canariense (d'Orbigny).
,, *fontinense*, Terquem.
Trochammina squamata, Jones and Parker.

Station 308.

Cyclammina cancellata, Brady.
Textularia aspera, Brady.
„ *concava* (Karrer).
„ *gramen*, d'Orbigny.
Clavulina communis, d'Orbigny.
Bulimina marginata, d'Orbigny.
„ *pyrula*, d'Orbigny.
„ *subteres*, Brady.
Bolivina punctata, d'Orbigny.
Cassidulina bradyi, Norman.
„ *crassa*, d'Orbigny.
„ *lævigata*, d'Orbigny.
„ *parkeriana*, Brady.
Ehrenbergina pupa (d'Orbigny).
Lagena distoma, Parker and Jones.
„ *gracilis*, Williamson.
„ *hispida*, Reuss.
„ *læris* (Montagu).
„ *marginata* (Walker and Boys).
„ *semistriata*, Williamson.
„ *striata* (d'Orbigny).
„ *sulcata* (Walker and Jacob).
Nodosaria communis, d'Orbigny.
„ (*Glandulina*) *lævigata*, d'Orbigny.
Marginulina glabra, d'Orbigny.
Cristellaria acutauricularis (Fichtel and Moll).
„ *cultrata* (Montfort).
„ *reniformis*, d'Orbigny.
Uvigerina angulosa, Williamson.
„ *canariensis*, d'Orbigny.
„ *pygmæa*, d'Orbigny.
„ *tenuistriata*, Reuss.
Sagrina dimorpha, Parker and Jones.
× *Globigerina bulloides*, d'Orbigny.
× „ *inflata*, d'Orbigny.
× *Orbulina universa*, d'Orbigny.
Pullenia quinqueloba, Reuss.
„ *sphæroides* (d'Orbigny).
Discorbina globularis (d'Orbigny).
Truncatulina haidingerii (d'Orbigny).
„ *lobatula* (Walker and Jacob).
„ *refulgens* (Montfort).
„ *variabilis*, d'Orbigny.
Anomalina coronata, Parker and Jones.
Pulvinulina umbonata, Reuss.
Rotalia beccarii (Linné).
„ *clathrata*, Brady.
Nonionina scapha (Fichtel and Moll).
„ *umbilicatula* (Montagu).

Stations 309 and 309a.

Stations 309 and 309A (Soundings 457 and 458). Gulf of Peñas to Sandy Point through Magellan Strait (see Chart 41).

January 8, 1876 ; lat. 50° 56′ S., long. 74° 15′ to 74° 14′ W.
Temperature of air at noon, 51°·5 ; mean for the day, 48°·4.
Temperature of water at surface, 50°·5 ; bottom (40 fathoms), 47°·0.
Density at 60° F. at surface, 1·01896 ; 40 fathoms, 1·02417 ; bottom, 1·02446.
Depth, 40 and 140 fathoms ; deposit, Blue Mud, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4 A.M. got up steam, and at 4.45 A.M. weighed anchor and proceeded out of Tom Bay for Trinidad Channel. At 2.15 P.M. stopped and sounded in 40 fathoms (Station 309), and put trawl over. At 3 P.M. sounded in 140 fathoms (Station 309a). At 3.45 P.M. hove up trawl with many specimens, and proceeded. The carbonic acid was determined in surface water, and amounted to 39·5 milligrammes per litre. At 4.30 P.M. anchored in 7 fathoms in Puerto Bueno. Exploring parties went on shore.

Stations 309 and 309a. Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this place :—

Asteroidea (Sladen, Zool. pt. 51).

Ctenodiscus procurator, n.sp. Many specimens ; obtained also at Stations 306, 307, 308, and 311.

Lophaster stellans, n.sp. Obtained also at Station 308.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha lymani, Ljungman. For distribution see Station 304.

Astrotoma agassizii, Lyman. Obtained also at Stations 148, 150, 307, 308, and 313.

Echinoidea (Agassiz, Zool. pt. 9).

Schizaster moseleyi, n.sp. Numerous specimens ; for distribution see Station 146.

Holothurioidea (Théel, Zool. pt. 39).

Trochostoma (?) sp. (Fragmentary specimen indeterminable).

Pseudostichopus mollis, n.g., n.sp. Six specimens ; obtained also at Stations 144 and 311.

Annelida (M'Intosh, Zool. pt. 34).

Aphrodita echidna, Quatrefages (?). Three specimens ; obtained also at Station 307.

Macrura (Spence Bate, Zool. pt. 52).

Campylonotus semistriatus, n.g., n.sp. Three specimens ; for distribution see Station 305.

Gasteropoda (Watson, Zool. pt. 42).

Triton (*Lagena*) *magellanicus* (Chemnitz). Obtained also at Station 144.

Fishes (Günther, Zool. pts. 6 and 57).

Lycodes macrops, n.sp. One specimen ; obtained at no other locality.

Macrurus fasciatus, n.sp. Two specimens ; obtained also at Stations 305 and 311.

In addition to the foregoing, the following are recorded in the Station-book :— Gorgonoid, many Annelids in rigid mud tubes, and *Galathea*.

Excluding Protozoa, over 100 specimens of invertebrates and fishes were obtained at this Station, belonging to about 15 species, of which 7 are new to science, including representatives of 2 new genera ; 1 of the new species was not obtained elsewhere.

Stations 309 and 309a. Organisms from Surface-Nets.

Surface Organisms.—The tow-nets on this date procured more pelagic forms than in Messier Channel, and in Puerto Bueno on January 9 there were many specimens of *Peridinium*, Infusoria, Medusæ, Copepods, many young mussels (?), *Membranipora* larvæ, *Appendicularia*.

Station 310.

Station 310 (Sounding 459), Gulf of Peñas to Sandy Point through Magellan Strait (see Chart 41).

January 10, 1876 ; lat. 51° 27′ 30″ S., long. 74° 3′ W.
Temperature of air at noon, 48°·8 ; mean for the day, 48°·5.
Temperature of water at surface, 50°·5 ; bottom, 46°·5.
Density at 60° F. :—

Surface,	1·01910	200 fathoms,	1·02458
25 fathoms,	1·02315	Bottom,	1·02451

Depth, 400 fathoms ; deposit, Blue Mud, containing only a trace of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 3.30 A.M. got up steam. At 4.50 A.M. weighed anchor and proceeded out of Puerto Bueno, steaming through the Sarmiento Channel. At 8.30 A.M. stopped and sounded in 400 fathoms. Put over trawl, which came up at 10.45 A.M. containing many specimens. The carbonic acid was determined in water from 200 fathoms, and amounted to 70·8 milligrammes per litre. At 4.40 P.M. anchored in Innocentes Bay in 25 fathoms. Exploring parties went on shore.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Hexactinellida (Schulze, Zool. pt. 53).

Acanthascus dubius, n.g., n.sp. One specimen ; obtained at no other locality.
Rhabdocalyptus rœperi, n.g., n.sp. Two specimens ; obtained at no other locality.

Alcyonaria (Wright and Studer, Zool. pt. 64).

Thouarella köllikeri, n.sp. One specimen ; obtained also at Station 308.
Paramuricea laxa, n.sp. Many specimens ; obtained at no other locality.
Clematissa robusta, n.g., n.sp. Many specimens ; obtained at no other locality.
Lepiogorgia purpurea (Pallas). One specimen ; obtained also at Bahia.

ANTIPATHARIA (Brook, Zool. pt. 80). STATION 310.

Tylopathes crispa, n.g., n.sp. Obtained at no other locality.

OPHIUROIDEA (Lyman, Zool. pt. 14).

Ophiolebes vestitus, n.g., n.sp. Obtained also at Stations 307 and 308.

Astroschema rubrum, n.sp. Obtained at no other locality.

ECHINOIDEA (Agassiz, Zool. pt. 9).

Hemiaster cavernosus (Phil.). Obtained also at Stations 149 and 151.

Schizaster moseleyi, n.sp. Three specimens; for distribution see Station 146.

HOLOTHURIOIDEA (Théel, Zool. pt. 39).

Ankyroderma danielsseni, n.sp. One specimen; obtained at no other locality.

ANNELIDA (M'Intosh, Zool. pt. 34).

Polyeunoa lævis, n.g., n.sp. Two specimens; obtained also at Station 145. Only species of the genus.

Lagisca magellanica, n.sp., var. *murrayi*, nov. Several specimens; the species obtained also at Stations 145 (var. *grubei*), 149, and 308.

Hemipodus (?) *magellanicus*, n.sp. Many specimens; obtained also at Station 306.

MACRURA (Spence Bate, Zool. pt. 52).

Acanthephyra carinata, n.sp. One specimen; obtained at no other locality.

,, *approxima*, n.sp. One specimen; obtained at no other locality.

Campylonotus semistriatus, n.g., n.sp. Six specimens; for distribution see Station 305.

ANOMURA (Henderson, Zool. pt. 69).

Munidopsis trifida, n.sp. One specimen; obtained at no other locality.

Ptychogaster milne-edwardsi, n.sp. One specimen; obtained at no other locality.

Uroptychus parvulus, n.sp. Thirty specimens; obtained at no other locality.

PYCNOGONIDA (Hoek, Zool. pt. 10).

Colossendeis leptorhynchus, n.sp. Obtained also at Stations 146, 147, and 300.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Pecten vitreus (Chemnitz). For distribution see Station 204.

,, *subhyalinus*, n.sp. Obtained at no other locality.

Station 310.

Polyplacophora (Haddon, Zool. pt. 43).

Lepidopleurus dallii, n.sp. Obtained at no other locality.

Fishes (Günther, Zool. pt. 57).

Scyllium canescens, n.sp. One specimen; obtained at no other locality.
Paraliparis membranaceus, n.sp. One specimen; obtained at no other locality.
Notacanthus bonapartii, Risso. One specimen; obtained at no other locality by the Challenger. Recorded from Mediterranean.

In addition to the foregoing, the following are recorded in the Station-book:—Many large masses of *Lophohelia*, and calcareous Polyzoon.

Excluding Protozoa, over 150 specimens of invertebrates and fishes were obtained at this Station, belonging to about 30 species, of which 24 are new to science, including representatives of 7 new genera; 16 of the new species were not obtained elsewhere.

Organisms from the Deposit.

Foraminifera (Brady, Zool. pt. 22).—The following species of Foraminifera, were observed in the deposit from this Station; the only pelagic species is *Globigerina bulloides*:—

Biloculina ringens (Lamarck).
„ *sphæra*, d'Orbigny.
Miliolina seminulum (Linné).
Reophax difflugiformis, Brady.
„ *pilulifera*, Brady.
„ *scorpiurus*, Montfort.
Haplophragmium canariense (d'Orbigny).
„ *scitulum*, Brady.
Hormosina globulifera, Brady.
Ammodiscus gordialis (Jones and Parker).
„ *tenuis*, Brady.
Trochammina squamata, Jones and Parker.
Cyclammina cancellata, Brady.
Clavulina communis, d'Orbigny.
Bulimina pyrula, d'Orbigny.
Bolivina robusta, Brady.
Cassidulina crassa, d'Orbigny.
Lagena lævis (Montagu).
Nodosaria communis, d'Orbigny.
Cristellaria rotulata (Lamarck).
Sagrina dimorpha, Parker and Jones.
× *Globigerina bulloides*, d'Orbigny.
Spirillina tuberculata, Brady.
Truncatulina tenera, Brady.
Nonionina depressula (Walker and Jacob).
„ *scapha* (Fichtel and Moll).

Organisms from Surface-Nets.

Surface Organisms.—The tow-nets procured: — Diatoms, many specimens of *Peridinium*, many Infusoria, many small Medusæ, Annelid larvæ, Daphnids, Copepods, Amphipods, many larval Lamellibranchs (young mussels), *Membranipora* larvæ, *Appendicularia*.

Station 311 (Sounding 460), Gulf of Peñas to Sandy Point through Magellan Strait (see Chart 41). STATION 311.

January 11, 1876 ; lat. 52° 45′ 30″ S., long. 73° 46′ W.
Temperature of air at noon, 50°·0 ; mean for the day, 48°·3.
Temperature of water at surface, 50°·0 ; bottom, 46°·0.
Density at 60° F. :—

Surface, . . .	1·01904	100 fathoms, . .	1·02452
25 fathoms, . .	1·02271	200 „ . .	1·02388
50 „ . . .	1·02412	Bottom, . . .	1·02454

Depth, 245 fathoms ; deposit, Blue Mud, containing 34·07 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 3.30 A.M. got up steam. At 4.30 A.M. proceeded out of Innocentes Bay. At 10.30 A.M. stopped and sounded in 245 fathoms. Put over trawl, which came up at 12.30 P.M. containing numerous specimens. The carbonic acid was determined in bottom water and amounted to 51·2 milligrammes per litre. Proceeded for Port Churruca and anchored there at 2.45 P.M. in 14 fathoms. Exploring parties went on shore.

The following species are recorded in the Zoological Reports from the trawl at this Station :— ANIMALS FROM TRAWL.

MONAXONIDA (Ridley and Dendy, Zool. pt. 59).

Gellius carduus, n.sp., var. *magellanica*, nov. One specimen ; the species obtained also at Stations 145 and 148.

Tedania tenuicapitata, Ridley. Several specimens ; obtained also at Stations 308 and 314.

Trachytedania patagonica, n.sp. One specimen (Station doubtful) ; obtained also at Station 308.

Iophon pattersoni (Bowerbank). Numerous fragments ; obtained also at Stations 135 and 308.

Myxilla mollis, n.sp. Five specimens (Station 308 or 311, or both).

„ *nobilis*, n.sp., var. *patagonica*, nov. One specimen and fragments ; the species obtained also at Stations 148, 307 (var. *bacillifera*), and 320.

TETRACTINELLIDA (Sollas, Zool. pt. 63).

Cydonium magellani, n.sp. Several specimens ; obtained also at Station 308.

Station 311.

Alcyonaria (Wright and Studer, Zool. pt. 64).

Clematissa obtusa, n.g., n.sp. Several specimens; obtained at no other locality.

Actiniaria (Hertwig, Zool. pt. 73).

Phellia spinifera, n.sp. Three specimens; obtained also at Station 320, 600 fathoms.

Corals (Moseley, Zool. pt. 7).

Desmophyllum ingens, n.sp. Several specimens; obtained also at Stations 306, 307, and 308.

Asteroidea (Sladen, Zool. pt. 51).

Pontaster planeta, n.g., n.sp. Many specimens; obtained at no other locality.
Ctenodiscus procurator, n.sp. Obtained also at Stations 306, 307, 308, and 309.
Bathybiaster loripes, n.sp. Obtained also at Stations 149 and 151 (var. *obesa*).
Pentagonaster patagonicus, n.sp. Several specimens; obtained also at Station 313, 55 fathoms.
Mimaster cognatus, n.sp. Obtained also at Station 308.
Stichaster polygrammus, n.sp. Obtained at no other locality.
Pteraster stellifer, n.sp. Obtained at no other locality.
Retaster gibber, n.sp. Obtained at no other locality.
Cribrella obesa, n.sp. Several specimens; obtained also at Station 315, 12 fathoms.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha lymani, Ljungman. For distribution see Station 304.
Ophiactis asperula (Phil.). For distribution see Station 308.

Echinoidea (Agassiz, Zool. pt. 9).

Echinus margaritaceus, Lamarck. Four specimens; for distribution see Station 149.
Schizaster moseleyi, n.sp. For distribution see Station 146.

Holothurioidea (Théel, Zool. pt. 39).

Psolus disciformis, n.sp. Two specimens; obtained at no other locality.
,, *squamatus*, Düben and Koren (var. ?). Several specimens; obtained also at Stations 307 and 308.
Stichopus moseleyi, n.sp. Several specimens; obtained also at Stations 306 and 308.
Pseudostichopus mollis, n.g., n.sp. Numerous specimens; obtained also at Stations 144 and 309.

ANNELIDA (M'Intosh, Zool. pt. 34). STATION 311.

Eunoa opalina, n.sp. Several specimens; obtained also at Station 299 (eyeless variety).

Eunice magellanica, n.sp. Several specimens; obtained also at Stations 149 and 308.

OSTRACODA (Brady, Zool. pt. 3).

Cythere dasyderma, n.sp. For distribution see Station 5.

Krithe producta, n.sp. For distribution see Station 70.

Pseudocythere fuegiensis, n.sp. Obtained at no other locality.

MACRURA (Spence Bate, Zool. pt. 52).

Stereomastis suhmi, n.g., n.sp. Nine specimens; obtained also at Station 305.

Campylonotus semistriatus, n.g., n.sp. Many specimens; for distribution see Station 305.

Pasiphæa acutifrons, n.sp. One specimen; obtained also at Station 236.

ANOMURA (Henderson, Zool. pt. 69).

Parapagurus dimorphus (Studer). Several specimens; obtained also at Stations 135, 142, and 145.

Elasmonotus asper, n.sp. Over a dozen specimens; obtained at no other locality.

BRACHYURA (Miers, Zool. pt. 49).

Libinia smithii, n.sp. One specimen; obtained at no other locality.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Saxicava arctica, Linné. For distribution see Station 75.

Lucina lamellata, Smith. Several specimens; obtained at no other locality by the Challenger. Recorded from St. Andrew's Sound and S.W. Patagonia.

Solemya patagonica, n.sp. One specimen; obtained at no other locality.

Modiolarca trapezina (Lamarck). Single valve; obtained also at Stations 145, 149, and 315.

Lima goliath, Sowerby. Single valve; obtained also at Station 236.

Pecten vitreus (Chemnitz). For distribution see Station 204.

GASTEROPODA (Watson, Zool. pt. 42).

Trophon acanthodes, n.sp. Two specimens; obtained also at Station 308.

Capulus compressus, Smith, n.sp. [See *Proc. Zool. Soc. Lond.*, 1891, p. 437].

Station 311

Cephalodiscus (M'Intosh, Zool. pt. 62).

Cephalodiscus dodecalophus, n.g., n.sp. Obtained at no other locality. Only species of the genus.

Tunicata (Herdman, Zool. pts. 17 and 38).

Ascidia tenera, n.sp. Three specimens; obtained also at Station 320, 600 fathoms.
Colella ramulosa, n.g., n.sp. About twelve specimens; obtained at no other locality.
Amaroucium recumbens, n.sp. One specimen; obtained at no other locality.
Leptoclinum tenue, n.sp. About twenty specimens; obtained also at Stations 308 and 320.
,, *propinquum*, n.sp. Several specimens; obtained at no other locality.

Fishes (Günther, Zool. pt. 57).

Centroscyllium granulatum, n.sp. One specimen; obtained at no other locality.
Macrurus fasciatus, n.sp. Five specimens; obtained also at Stations 305 and 309.

In addition to the foregoing, the following are recorded in the Station-book:—*Epizoanthus* (?) on Gorgonoid stems, *Euryale*, *Ophiomyxa*, two specimens of *Ophiolepis*, and several other Ophiurids of three species (only two species of Ophiuroidea noted above), very many specimens of *Hemiaster* of two species, Aphroditacean, *Dentalium*, several specimens of *Patella* (?), *Idmonea*, and *Terebratula*.

Excluding Protozoa, over 350 specimens of invertebrates and fishes were obtained at this Station, belonging to about 65 species, of which 42 are new to science, including representatives of 7 new genera; 16 of the new species and 1 new genus were not obtained elsewhere.

Organisms from the Deposit.

Foraminifera (Brady, Zool. pt. 22).—The following species of Foraminifera were observed during the examination of the deposit from this Station; the single pelagic species (*Globigerina bulloides*) makes up about 23 per cent. of the carbonate of lime present in the deposit:—

Biloculina depressa, d'Orbigny.
,, *elongata*, d'Orbigny.
,, *ringens* (Lamarck).
,, *sphæra*, d'Orbigny.
Miliolina auberiana (d'Orbigny).
,, *oblonga* (Montagu).
,, *seminulum* (Linné).
Reophax scorpiurus, Montfort.
Haplophragmium canariense (d'Orbigny).
,, *latidorsatum* (Bornemann).
Clavulina communis, d'Orbigny.
Bulimina pupoides, d'Orbigny.
,, *pyrula*, d'Orbigny.
Cassidulina crassa, d'Orbigny.
,, *lævigata*, d'Orbigny.
Lagena distoma, Parker and Jones.
,, *hispida*, Reuss.
,, *lævis* (Montagu).
,, *striata* (d'Orbigny).
,, *striatopunctata*, Parker and Jones.
Nodosaria (*Glandulina*) *lævigata*, d'Orbigny.
,, (*Dentalina*) *pauperata*, d'Orbigny.

Nodosaria pyrula, d'Orbigny.
Cristellaria rotulata (Lamarck).
Uvigerina angulosa, Williamson.
„ *asperula*, Czjzek.
„ *brunnensis*, Karrer.
× *Globigerina bulloides*, d'Orbigny.
Discorbina rosacea (d'Orbigny).
Truncatulina lobatula (Walker and Jacob).
„ *refulgens* (Montfort).
„ *variabilis*, d'Orbigny.
Pulvinulina umbonata, Reuss.
Nonionina scapha (Fichtel and Moll).
„ *stelligera*, d'Orbigny.

STATION 311.

Surface Organisms.—The following species is recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

TUNICATA (Herdman, Zool. pt. 76).

Salpa cordiformis-zonaria, Quoy and Gaimard—Pallas.

The tow-net yielded many large Diatoms (*Coscinodiscus*) and many smaller ones, many specimens of *Peridinium*, Medusæ, Copepods, Cypris stage of Cirripeds, and larval Lamellibranchs (mussels).

Station 312 (Sounding 461), Gulf of Peñas to Sandy Point through Magellan Strait (see Chart 41). STATION 312.

January 13, 1876 ; lat. 53° 37′ 30″ S., long. 70° 56′ W.
Temperature of air at noon, 51°·8 ; mean for the day, 51°·9.
Temperature of water at surface, 47°·8.
Density at 60° F. at surface, 1·02233.
Depth, 9 fathoms ; deposit, Blue Mud.

At 4 A.M. weighed anchor and proceeded out of Port Churruca. At 6.30 P.M. stopped and anchored in 9 fathoms in Port Famine. Lowered trawl twice from the boats and hauled it on board, bringing up many specimens. Specimens of *Munida* came up in such quantities that they were eaten by the ship's company. Exploring parties went on shore.

The following species are recorded in the Zoological Reports from the trawl at this Station (9 to 15 fathoms) :— ANIMALS FROM TRAWL.

ACTINIARIA (Hertwig, Zool. pt. 15).

Dysactis crassicornis, n.sp. One specimen ; obtained also at Station 313, 55 fathoms.

Station 312.

Hydroida (Allman, Zool. pt. 70).

Halecium flexile, n.sp. Several specimens; obtained also at Station 145.

,, *cymiforme*, n.sp. Obtained at no other locality.

Hebella striata, n.g., n.sp. Several specimens; obtained at no other locality.

Lafoëa fruticosa, Sars. Obtained at no other locality by the Challenger. Recorded from European seas.

Sertularia gracilis, n.sp. Numerous specimens; obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophiactis asperula (Phil.). Several specimens; for distribution see Station 308.

Echinoidea (Agassiz, Zool. pt. 9).

Echinus magellanicus, Phil. For distribution see Station 145.

Cirripedia (Hoek, Zool. pt. 25).

Balanus lævis, Bruguière. Numerous specimens; obtained at no other locality by the Challenger. Recorded from Magellan Strait and west coast of North and South America.

Amphipoda (Stebbing, Zool. pt. 67).

Hyperia gaudichaudii, M.-Edwards. Over thirty specimens; obtained at no other locality by the Challenger. Recorded from Chili.

Anomura (Henderson, Zool. pt. 69).

Munida subrugosa (White). Numerous specimens; for distribution see Station 304.

Brachyura (Miers, Zool. pt. 49).

Eurypodius latreillei, Guérin-Ménéville. Twelve specimens; for distribution see Station 304.

Lamellibranchiata (Smith, Zool. pt. 35).

Pecten patagonicus, King. Many specimens; obtained also at Station 315, 12 fathoms.

Gasteropoda (Watson, Zool. pt. 42).

Puncturella noachina (Linné), var. *galeata*, Gould. For distribution see Station 144.

Polyzoa (Busk, Zool. pt. 30). Station 312.

Carbasea ovoidea, Busk. Many specimens; for distribution see Station 144.

Schizoporella longispinata, n.sp. Many specimens; obtained at no other locality.

Brachiopoda (Davidson, Zool. pt. 1).

Magasella flexuosa (King). Thirteen specimens; obtained also at Station 315, 5 to 12 fathoms. Recorded from Patagonia.

Tunicata (Herdman, Zool. pt. 17).

Boltenia legumen, Lesson. One specimen; obtained also at Stations 315 and 316, 4 to 12 fathoms. Recorded from Antarctic, Falklands, Possession Bay, Philip Bay, Peckett Harbour, and British Islands.

Fishes (Günther, Zool. pt. 6).

Agonus chiloensis, Jen. Obtained at no other locality by the Challenger.

Aphritis gobio, Günther. Obtained also at Stations 307 and 308.

Notothenia longipes, Steindachner. Obtained also at Stations 306 and 313.

In addition to the foregoing, the following are recorded in the Station-book:—Sponge and two or three large Annelids (*Eunice* ?) in tough leathery tubes.

Excluding Protozoa, over 200 specimens of invertebrates and fishes were obtained at this Station, belonging to about 23 species, of which 6 are new to science, including representative of 1 new genus; 4 of the new species were not obtained elsewhere.

The following species are recorded in the Zoological Reports as having been obtained in Magellan Strait and other channels between the Gulf of Peñas and Sandy Point, in shallow water, on shore, &c.:— Animals from Magellan Strait.

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Halichondria caduca, Bowerbank. One specimen (S.W. Patagonia); obtained at no other locality by the Challenger. Recorded from British seas.

Reniera aquæductus, Schmidt, var. *infundibularis*, nov. Two or three specimens (S.W. Patagonia); obtained also at Station 307.

Tedania infundibuliformis, n.sp. One specimen (S.W. Patagonia); obtained at no other locality.

Myxilla mariana, n.sp., var. *massa*, nov. One specimen (S.W. Patagonia); the species obtained also at Marion Island.

Hymeniacidon (?) *hyalina*, n.sp. Two or three specimens (S.W. Patagonia); obtained at no other locality.

Magellan Strait.

Suberites spiralis, n.sp. One specimen (S.W. Patagonia); obtained at no other locality.

Asteroidea (Sladen, Zool. pt. 51).

Calvasterias stolidota, n.sp. (Messier Channel); obtained also at Station 315, 5 to 10 fathoms.

Ophiuroidea (Lyman, Zool. pt. 14).

Astrotoma agassizii, Lyman. (Magellan Strait, 135 fathoms); obtained also at Stations 148, 150, 307, 308, 309, and 313.

Ophiactis n.sp., (young). (Magellan Strait).

Entozoa (Linstow, Zool. pt. 71).

Ascaris biloba, n.sp. Five specimens (Magellan Strait—host not recorded); obtained at no other locality.

Isopoda.

One specimen, genus and species undetermined. (Magellan Strait).

Anomura (Henderson, Zool. pt. 69).

Munida subrugosa (White). Several specimens from stomach of fish (Gray's Harbour); for distribution see Station 304.

Petrolisthes validus (Dana). One specimen (Messier Channel); obtained also at Valparaiso.

Brachyura (Miers, Zool. pt. 49).

Acanthocyclus gayi, M.-Edwards and Lucas. One specimen (Messier Channel, fresh water); obtained also at Valparaiso.

Fishes (Günther, Zool. pts. 6 and 57).

Scyllium chilense, Guichen. (Gray's Harbour); obtained at no other locality by the Challenger.

Sebastes oculatus, C.V. (Puerto Bueno); obtained also at Stations 306 and 307.

Aphritis gobio, Günther. (Puerto Bueno); obtained also at Stations 307, 308, and 312.

Eleginus maclovinus, C.V. (Gray's Harbour); obtained also at Falklands.

Merluccius gayi (Guichen.). (Gray's Harbour); obtained also at Valparaiso.

Haplochiton zebra, Jen. (Stream at Gray's Harbour and lake at Puerto Bueno); obtained also at Falklands.

Myxine australis, Jen. (Grapler Harbour and Port Churruca); obtained also at Station 232.

PORT OTWAY

through

MAGELLAN STRAIT

touching at

HALE COVE, GRAY Hr, PORT GRAPPLER,
TOM BAY, PUERTA BUENO, ISTHMUS BAY,
PORT CHURRUCA, PORT FAMINE,
SANDY POINT AND ELIZABETH I.

Jan.y 1876.

For explanation of abbreviations &c. see Appendix I

C.Stª Lucia
Nelson Strait
Hope Inlet
Plain of Diana
Queen
Adelaide
Archipelago
Evangelists
Mt Burney (5800ft)
Smyth Ch.
Icy Sound
C. Pillar
Sea Reach
P. Churruca
Skyring Water
Otway Water
Cordova Penª
Long Reach
Landfall I.
Brunswick Penª
P. Gallant
C. Froward
Froward Reach
Stª Ines I.
P. Famine
Sandy Pt.
Broad Reach
First Narrows
Second Narrows
Elizabeth I.
Catherine Pt
C. Virgins
San Sebastian Bay
Useless Bay
TIERRA DEL FUEGO
Charles I.
Noir I.
Mt Sarmiento 6800ft
Mt Darwin 7000ft
Beagle Channel
Camden Iˢ
Stewart Iˢ
Hoste I.
Navarin I.
Nassau B.
York Minster
Christmas Sd
Ildefonso Idˢ
C. Horn
52°
53°
54°
55°
56°
77°
76°
75°
74°
73°
Long. West 72° from Greenwich
71°
70°
69°
68°
67°
Engraved by Malby & Sons

Salilota australis, n.g., n.sp. Two specimens (Puerto Bueno); obtained also at Stations 313 and 314, 55 and 70 fathoms. Only species of the genus. MAGELLAN STRAIT.

In the foregoing list 22 species are enumerated, of which 8 are new to science, including representative of 1 new genus; 4 of the new species were not obtained elsewhere.

Surface Organisms.—The following species are recorded from the surface in the same locality :— ORGANISMS FROM SURFACE-NETS.

COPEPODA (Brady, Zool. pt. 23).

Pleuromma abdominale (Lubbock). (W. Patagonia).
Acartia denticornis, n.sp. (?). (Magellan Strait).
Centropages brachiatus (Dana). (Magellan Strait).

STOMATOPODA (Brooks, Zool. pt. 45).

Alima bidens, Claus (=larva of *Squilla*). (Gulf of Peñas).

TUNICATA (Herdman, Zool. pt. 76).

Salpa cordiformis-zonaria, Quoy and Gaimard—Pallas. (Magellan Strait).

The ship left Port Famine early on the morning of January 18 and anchored at 10 A.M. off Elizabeth Island, the 18th and 19th being spent by the naturalists on shore.

E. ATLANTIC OCEAN (homeward voyage).

Station 313 (Sounding 462), Sandy Point to Falkland Islands (see Charts 41 and 42). STATION 313.

January 20, 1876; lat. 52° 20′ S., long. 67° 39′ W.
Temperature of air at noon, 53°·8; mean for the day, 50°·6.
Temperature of water at surface, 48°·2; bottom, 47°·8.
Density at 60° F. at surface, 1·02437; bottom, 1·02439.
Depth, 55 fathoms; deposit, Coarse Sand, containing 1·13 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

Early in the morning weighed anchor, and proceeded out of Magellan Strait into the Atlantic. At 4.30 P.M. shortened and furled sails and stopped to sound and trawl. Sounded in 55 fathoms. Put over trawl, which came up at 7.15 P.M. with numerous specimens. Proceeded towards the Falklands.

Station 313. Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Tedania massa, n.sp. Several specimens ; obtained also at Stations 163 and 320.
Esperella magellanica (Ridley). One specimen ; obtained at no other locality by the Challenger. Recorded from Patagonia and Magellan Strait.
Esperiopsis edwardii (Bowerbank), var. *americana*, nov. One specimen ; obtained at no other locality. The species recorded from British seas.
Hymeniacidon sp. (?). One specimen indeterminable.
Axinella fibrosa, n.sp. One specimen ; obtained at no other locality.

Alcyonaria (Wright and Studer, Zool. pt. 64).

Alcyonium sollasi, n.sp. Several specimens ; obtained at no other locality.

Actiniaria (Hertwig, Zool. pts. 15 and 73).

Dysactis crassicornis, n.sp. Six specimens ; obtained also at Station 312.
„ *rhodora* (Couthouy). Two specimens ; obtained at no other locality by the Challenger.
Antholoba reticulata (Couthouy). Three specimens ; obtained at no other locality by the Challenger.

Asteroidea (Sladen, Zool. pt. 51).

Ctenodiscus australis (Lovén, MS.), Lütken. Obtained also at Station 320, 600 fathoms. Recorded from eastern South America.
Pentagonaster patagonicus, n.sp. Several specimens ; obtained also at Station 311.
Gnathaster pilulatus, n.g., n.sp. Several specimens ; obtained at no other locality.
Cycethra nitida, n.sp. Several specimens ; obtained at no other locality.
„ *pinguis*, n.sp. Obtained at no other locality.
Ganeria falklandica, Gray. Several specimens ; obtained at no other locality by the Challenger. Recorded from Falklands.
Retaster verrucosus, n.sp. Several specimens ; obtained at no other locality.
Asterias glomerata, n.sp. Obtained also at Station 315, 12 fathoms.
„ *cunninghami*, Perrier. Obtained also at Station 315, 12 fathoms. Recorded from Falklands, Magellan Strait, and Patagonia.
Labidiaster radiosus (Lovén, MS.), Lütken. Obtained at no other locality by the Challenger. Recorded from Patagonia, Magellan Strait, and Rio de la Plata.

Ophiuroidea (Lyman, Zool. pt. 14). Station 313.

Ophioglypha lymani, Ljungman. Many specimens; for distribution see Station 304.

Ophiacantha vivipara, Ljungman. Many specimens ; for distribution see Station 145.

Ophiomyxa vivipara, Studer. Many specimens; obtained also at Stations 142, 308, and 314.

Gorgonocephalus pourtalesii, Lyman. Many specimens; obtained also at Stations 149, 150, 151, 307, 308, and 314.

Astrotoma agassizii, Lyman. Many specimens; obtained also at Stations 148, 150, 307, 308, and 309.

Echinoidea (Agassiz, Zool. pt. 9).

Goniocidaris canaliculata, Agassiz. Several specimens; obtained also at Stations 147, 149, 150, 151, 153, 156, and 315.

Holothurioidea (Théel, Zool. pt. 39).

Chirodota contorta, Ludwig. A few specimens; obtained also at Stations 145, 149, and 314.

Cucumaria crocea, Lesson. A few specimens; obtained also at Stations 314, 315, and 316, 4 to 70 fathoms. Recorded from Falkland Islands.

Annelida (M'Intosh, Zool. pt. 34).

Nereis patagonica, n.sp. Several specimens; obtained at no other locality.

Neottis antarctica, M'Intosh. One specimen; obtained also at Stations 145, 149, 150, and 151.

Ostracoda (Brady, Zool. pt. 3).

Cythere scintillulata, n.sp. Obtained at no other locality.

„ *reussi*, Brady. Obtained also at Station 187 and Sandwich Islands.

Cytherura rudis, Brady (?). Obtained at no other locality by the Challenger. Recorded from Davis Strait.

Bythocythere (?) *exigua*, n.sp. Obtained at no other locality.

Amphipoda (Stebbing, Zool. pt. 67).

Amaryllis macrophthalmus, Haswell (juv.). One specimen; obtained at no other locality by the Challenger. Recorded from Australia.

Acontiostoma magellanicum, n.g., n.sp. One specimen ; obtained at no other locality.

Metopa magellanica, n.sp. One specimen; obtained at no other locality.

„ *crenatipalmata*, n.sp. One specimen; obtained also at Station 135.

„ *parallelocheir*, n.sp. Two or three specimens; obtained at no other locality.

Station 313.

Metopa ovata, n.sp. One specimen; obtained at no other locality.

„ *compacta*, n.sp. One specimen; obtained at no other locality.

Seba saundersii, Stebbing. One specimen; obtained at no other locality by the Challenger. Recorded from Africa or Australia.

Atylopsis magellanicus, n.g., n.sp. Two specimens; obtained at no other locality.

„ *dentatus*, n.g., n.sp. One specimen; obtained at no other locality.

Chosroës incisus, n.g., n.sp. One specimen (young); obtained also at Station 314, 70 fathoms. Only species of the genus.

Isopoda (Beddard, Zool. pts. 33 and 48).

Serolis schythei, Lütken. Several specimens; for distribution see Station 304.

Arcturus americanus, n.sp. One specimen; obtained at no other locality.

Another specimen, genus and species undetermined.

Brachyura (Miers, Zool. pt. 49).

Eurypodius latreillei, Guérin-Ménéville. Thirteen specimens; for distribution see Station 304.

Pycnogonida (Hoek, Zool. pt. 10).

Colossendeis megalonyx, n.sp. Two specimens; obtained also at Stations 149 and 314.

Lamellibranchiata (Smith, Zool. pt. 35).

Saxicava arctica, Linné. For distribution see Station 75.

Cephalopoda (Hoyle, Zool. pt. 44).

Rossia sublevis, Verrill (?). One specimen; obtained at no other locality by the Challenger. Recorded from eastern North America.

„ *patagonica*, Smith. Twenty-six specimens; obtained at no other locality by the Challenger. Recorded from Patagonia.

Loligo (?) *ellipsura*, n.sp. Many specimens; obtained at no other locality.

Polyzoa (Busk, Zool. pt. 30).

Menipea benemunita, n.sp. Obtained also at Stations 149, 308, 314, and 315.

„ *flagellifera*, n.sp. Obtained also at Stations 145, 149, and 314.

Amphiblestrum umbonatum, Busk. Obtained also at Station 163.

Cribrilina monoceros (Busk). For distribution see Station 145.

Smittia marsupialis, n.sp. Obtained also at Sandwich Islands.

Cellepora bicornis, n.sp. Obtained also at Stations 145, 150, and 314.

Tunicata (Herdman, Zool. pts. 17 and 38). Station 313.

Molgula gigantea (Cunningham). Nearly forty specimens; obtained at no other locality by the Challenger. Recorded from Magellan Strait and Patagonian Bank.

Ascidia meridionalis, n.sp. Two specimens; obtained also at Station 320, 600 fathoms.

Colella pedunculata (Quoy and Gaimard). Five specimens; obtained also at Stations 149, 151, 314, and 315.

Atopogaster gigantea, n.g., n.sp. One specimen; obtained at no other locality.

,, *elongata*, n.g., n.sp. Numerous specimens; obtained also at the Cape (var. *pallida*).

Polyclinum incertum, n.sp. Three specimens; obtained at no other locality.

Amaroucium irregulare, n.sp. Over twelve specimens; obtained at no other locality.

,, ,, var. *concinnum*, nov. One specimen; obtained at no other locality.

,, *lævigatum*, n.sp. One specimen; obtained at no other locality.

——— (?) *ignotus*, n.sp. Two specimens (genus doubtful); obtained at no other locality by the Challenger. Recorded from Antarctic.

Goodsiria coccinea, Cunningham. About twenty specimens; obtained also at Stations 314 and 315, 70 and 12 fathoms. Recorded from Magellan Strait and Falkland Islands.

Synstyela incrustans, n.sp. Numerous specimens; obtained also at Philippines.

Fishes (Günther, Zool. pts. 6 and 57).

Raja brachyura, n.sp. Four specimens; obtained also at Station 314, 70 fathoms.

Psammobatis rudis, Günther. Obtained at no other locality by the Challenger.

Notothenia longipes, Steindachner. Obtained also at Stations 306 and 312.

,, *elegans*, n.sp. Obtained at no other locality.

Thysanopsetta naresi, n.g., n.sp. Obtained at no other locality. Only species of the genus.

Salilota australis, n.g., n.sp. Obtained also at Station 314 and Puerto Bueno. Only species of the genus.

In addition to the foregoing, the following are recorded in the Station-book:—Many Sertularians and many other Hydroids, *Brissopsis*, four specimens of *Margarita*, *Pleurotoma*, and several specimens of *Calyptræa*.

Excluding Protozoa, over 400 specimens of invertebrates and fishes were obtained at this Station, belonging to about 82 species, of which 42 are new to science, including representatives of 7 new genera; 26 of the new species and 1 new genus were not obtained elsewhere.

Station 313. Organisms from the Deposit.

Foraminifera (Brady, Zool. pt. 22).—The following species of Foraminifera were observed in the deposit from this Station; the only pelagic species is *Globigerina bulloides*:—

Biloculina ringens (Lamarck).
Miliolina oblonga (Montagu).
„ *seminulum* (Linné).
„ *subrotunda* (Montagu).
Haplophragmium canariense (d'Orbigny).
Cassidulina subglobosa, Brady.
Lagena laevigata (Reuss).
Lagena lævis (Montagu).
„ *sulcata* (Walker and Jacob).
× *Globigerina bulloides*, d'Orbigny.
Discorbina globularis (d'Orbigny).
Truncatulina lobatula (Walker and Jacob).
Polystomella crispa (Linné).

Organisms from Surface-Nets.

Surface Organisms.—The tow-net yielded compound Radiolaria, small Copepods, many Zoëæ of Crabs, Megalopæ, and larval Lamellibranchs.

Station 314.

Station 314 (Sounding 463), Sandy Point to Falkland Islands (see Chart 42).

January 21, 1876; lat. 51° 35′ S., long. 65° 39′ W.
Temperature of air at noon, 49°·8; mean for the day, 48°·9.
Temperature of water at surface, 48°·0; bottom, 46°·0.
Density at 60° F. at surface, 1·02468; bottom, 1·02476.
Depth, 70 fathoms; deposit, Coarse Sand.

At 9.10 A.M. shortened and furled sails. Sounded in 70 fathoms. Put over trawl, which came up at 10.40 A.M. with numerous specimens. The carbonic acid was determined in bottom water, and amounted to 42·4 milligrammes per litre. Proceeded.

Jason West Cay, Falkland Islands, distant at noon, 159 miles. Made good 122 miles. Amount of current 11 miles, direction N. 15° E.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station:—

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Petrosia similis, n.sp., var. *massa*, nov. Several specimens; the species obtained also at Stations 142, 150, and 208 (var. *compacta*).

Tedania tenuicapitata, Ridley. One specimen; obtained also at Stations 308 and 311.

Hydroida (Allman, Zool. pt. 70).

Grammaria magellanica, n.sp. Several specimens; obtained at no other locality.

Sertularia implexa, n.sp. Obtained at no other locality.

Thuiaria quadridens, n.sp. Obtained at no other locality.

OPHIUROIDEA (Lyman, Zool. pt. 14). STATION 314

Ophiacantha vivipara, Ljungman. Three specimens; for distribution see Station 145.

Ophiomyxa vivipara, Studer. Obtained also at Stations 142, 308, and 313.

Gorgonocephalus pourtalesii, Lyman. For distribution see Station 149.

HOLOTHURIOIDEA (Théel, Zool. pt. 39).

Cucumaria crocea, Lesson. Several specimens; obtained also at Stations 313, 315, and 316.

AMPHIPODA (Stebbing, Zool. pt. 67).

Chosroës incisus, n.g., n.sp. One specimen; obtained also at Station 313. Only species of the genus.

ISOPODA (Beddard, Zool. pt. 33).

Serolis schythei, Lütken. Several specimens; obtained also at Stations 304, 313, 315, and 316.

BRACHYURA (Miers, Zool. pt. 49).

Eurypodius latreillei, Guérin-Méneville. One specimen; for distribution see Station 304.

PYCNOGONIDA (Hoek, Zool. pt. 10).

Colossendeis megalonyx, n.sp. Two or three specimens; obtained also at Stations 149 and 313.

POLYZOA (Busk, Zool. pt. 30).

Menipea benemunita, n.sp. Obtained also at Stations 149, 308, 313, and 315.

,, *aculeata* (d'Orbigny). Obtained also at Stations 308 and 315.

,, *flagellifera*, n.sp. Obtained also at Stations 145, 149, and 313.

Ichthyaria oculata, n.g., n.sp. Obtained also at Station 320, 600 fathoms. Only species of the genus.

Carbasea elegans, Busk. Obtained also at Station 162.

Salicornaria variabilis, n.sp. Obtained also at Stations 149 and 304.

,, *tenuirostris*, Busk. Obtained at no other locality by the Challenger. Recorded from Australia and Florida Gulf.

Cellepora bicornis, n.sp. Obtained also at Stations 145, 150, and 313.

TUNICATA (Herdman, Zool. pt. 38).

Colella pedunculata (Quoy and Gaimard). Two specimens; obtained also at Stations 149, 151, 313, and 315.

Station 314. Fishes (Günther, Zool. pts. 6 and 57).

Raja brachyura, n.sp. Obtained also at Station 313.

Salilota australis, n.g., n.sp. One specimen; obtained also at Station 313 and Puerto Bueno. Only species of the genus.

In addition to the foregoing, the following are recorded in the Station-book :— Actinian (tentacles only), three specimens of *Astrogonium*, two specimens of *Ctenodiscus australis*, many specimens of *Chirodota*, Hirudinean on *Raja*, and *Idothea* (?).

Excluding Protozoa, over 100 specimens of invertebrates and fishes were obtained at this Station, belonging to about 30 species, of which 13 are new to science, including representatives of 3 new genera; 3 of the new species were not obtained elsewhere.

Organisms from Surface-Nets. Surface Organisms.—The following species are recorded from the surface at this Station :—

Amphipoda (Stebbing, Zool. pt. 67).

Euthemisto gaudichaudii (Guérin).

Schizopoda (Sars, Zool. pt. 37).

Euphausia splendens, Dana.

Thysanoëssa gregaria, n.sp.

Pteropoda (Pelseneer, Zool. pt. 58).

Spongiobranchæa australis, d'Orbigny.

Tunicata (Herdman, Zool. pt. 76).

Salpa echinata, n.sp.

The tow-net yielded compound Radiolaria, many small Copepods, Hyperids, and *Euphausiæ*.

Station 314a. **Station 314a** (Sounding 464), Sandy Point to Falkland Islands (see Chart 42).

January 22, 1876; lat. 51° 24′ S., long. 61° 46′ W.

Temperature of air at noon, 50°·3; mean for the day, 48°·6.

Temperature of water :—

Surface,	49°·0	50 fathoms,	45°·8
25 fathoms,	47°·4	Bottom,	41°·8

Density at 60° F. :—

Surface,	1·02486	50 fathoms,	1·02482
25 fathoms,	1·02483	Bottom,	1·02504

Depth, 110 fathoms; deposit, Hard Ground.

At 8.40 A.M. stopped and sounded in 110 fathoms. No deposit came up in the

sounding-tube. Took serial temperatures. The carbonic acid was determined in surface water, and amounted to 42·9 milligrammes per litre. Put over trawl, which came up at 10.15 A.M. empty. Owing to a strong northerly current, it probably did not touch the bottom. At 10.30 A.M. made sail. STATION 314A.

Jason West Cay distant at noon, 22 miles. Made good 135 miles.

The Challenger remained at the Falkland Islands from January 23 till February 6, 1876, during which time several dredgings and trawlings were taken from the steam pinnace and from the ship in Port William, Port Louis, &c., in from 4 to 12 fathoms (Stations 315 and 316). The deposit in Stanley Harbour, in 6 fathoms, was a Blue Mud containing 39·12 per cent. of carbonate of lime (for description of the islands see *Narr. Chall. Exp.*, vol. i. pp. 883–894). The following species are recorded in the Zoological Reports as having been obtained during the visit, the depth and locality being indicated:— AT FALKLAND ISLANDS.

HYDROIDA (Allman, Zool. pt. 70). ANIMALS FROM FALKLAND ISLANDS. (STATIONS 315 AND 316).

Obelia geniculata (Linné). (Station 315, 5 to 12 fathoms); obtained also at Station 149.

Hypanthea hemispherica, n.sp. (Station 315, 5 to 12 fathoms); obtained at no other locality.

Sertularia polyzonias, Linné. (Station 315, 5 to 12 fathoms); obtained at no other locality by the Challenger.

ASTEROIDEA (Sladen, Zool. pt. 51).

Cycethra electilis, n.sp. (Station 315, 12 fathoms); obtained at no other locality.

Cribrella obesa, n.sp. (Station 315, 12 fathoms); obtained also at Station 311.

Asterias glomerata, n.sp. (Station 315, 12 fathoms); obtained also at Station 313.

„ *cunninghami*, Perrier. (Station 315, 12 fathoms); obtained also at Station 313.

Calvasterias stolidota, n.sp. (Station 315, 5 to 10 fathoms); obtained also in Messier Channel.

OPHIUROIDEA (Lyman, Zool. pt. 14).

Ophiactis asperula (Phil.). (Station 315, 5 to 12 fathoms); obtained also at Stations 308, 311, and 312.

Ophiacantha vivipara, Ljungman. (Station 315, 5 to 12 fathoms); for distribution see Station 145.

ECHINOIDEA (Agassiz, Zool. pt. 9).

Goniocidaris canaliculata, Agassiz. (Station 315, 5 to 12 fathoms); for distribution see Station 147.

Falkland Islands.

Echinus magellanicus, Phil. (Station 315, 5 to 12 fathoms); for distribution see Station 145.

Holothurioidea (Théel, Zool. pt. 39).

Chirodota purpurea, Lesson. Numerous specimens (Station 316, 4 to 5 fathoms); obtained at no other locality by the Challenger. Recorded from Falklands.

,, *australiana*, Stimpson. Two specimens (Station 315, 5 to 10 fathoms); obtained at no other locality by the Challenger. Recorded from Australia.

Cucumaria crocea, Lesson. Numerous specimens (Stations 315 and 316, 4 to 12 fathoms); obtained also at Stations 313 and 314.

,, *mendax*, n.sp. Six specimens (Station 315, 5 to 12 fathoms); obtained at no other locality.

Annelida (M'Intosh, Zool. pt. 34).

Hermadion kerguelensis, n.sp. Several specimens (Station 315, 5 to 10 fathoms); obtained also at Station 149.

Nereis (*Platynereis*) *eatoni*, M'Intosh. One specimen (Station 315, 5 to 10 fathoms); obtained also at Stations 113, 145, and 149.

Ostracoda (Brady, Zool. pt. 3).

Aglaia (?) *meridionalis*, n.sp. (Stanley Harbour, 6 fathoms); obtained at no other locality.

Cythere moseleyi, n.sp. (Stanley Harbour, 6 fathoms); obtained at no other locality.

,, *falklandi*, n.sp. (Stanley Harbour, 6 fathoms); obtained at no other locality.

,, *fulvotincta*, n.sp. (Stanley Harbour, 6 fathoms); obtained at no other locality.

,, *impluta*, n.sp. (Stanley Harbour, 6 fathoms); obtained also at Station 135.

Xestoleberis polita, Brady. (Stanley Harbour, 6 fathoms); obtained at no other locality by the Challenger. Recorded from Magellan Strait.

Cytherura clavata, n.sp. (Stanley Harbour, 6 fathoms); obtained at no other locality.

Amphipoda (Stebbing, Zool. pt. 67).

Halirages huxleyanus (Spence Bate). One specimen (Stanley Harbour, from kelp); obtained at no other locality by the Challenger. Recorded from Hermit Island.

ISOPODA (Beddard, Zool. pt. 33).

Serolis paradoxa (Fabricius). Many specimens (Station 316, 4 fathoms); obtained at no other locality by the Challenger. Recorded from Patagonia, Africa (?), and New Zealand (?).

„ *convexa*, Cunningham. One specimen (Station 315, 5 to 12 fathoms); obtained at no other locality by the Challenger. Recorded from Fuegia.

„ *schythei*, Lütken. Several specimens (Stations 315 and 316, 4 to 12 fathoms); obtained also at Stations 304, 313, and 314.

MACRURA (Spence Bate, Zool. pt. 52).

Nauticaris marionis, n.g., n.sp. One specimen (Station 315, 12 fathoms); obtained also at Station 145.

ANOMURA (Henderson, Zool. pt. 69).

Paralomis verrucosus (Dana). Two specimens (Station 316, 4 fathoms, and Port Stanley); obtained also at another locality uncertain. Recorded from Fuegia.

Eupagurus comptus (White), var. *jugosa*, nov. One specimen (Station 315, 5 to 12 fathoms); obtained also at Station 308.

Porcellanella triloba, White. One specimen (Station 315, 5 to 12 fathoms); obtained also at Station 212.

Munida subrugosa (White). Four specimens (Station 315, 5 to 12 fathoms); for distribution see Station 304.

BRACHYURA (Miers, Zool. pt. 49).

Eurypodius latreillei, Guérin-Ménéville. Ten specimens (Stations 315 and 316, 4 to 12 fathoms); for distribution see Station 304.

Hypopeltarium spinosulum (White). Eight specimens (Stations 315 and 316, 4 to 12 fathoms); obtained also at Station 304.

Halicarcinus planatus (Fabricius). Six specimens (Station 316, 4 fathoms); obtained also at Stations 145 and 149.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Tapes (*Amygdala*) *exalbida* (Chemnitz). (Station 316, 4 to 5 fathoms); obtained at no other locality by the Challenger. Recorded from Magellan Strait.

Cryptodon falklandicus, n.sp. (Station 316, 3 to 5 fathoms); obtained at no other locality.

FALKLAND ISLANDS.

Mytilus edulis, Linné. (Station 315, 12 fathoms); obtained also at Station 322, 21 fathoms. A widely-distributed species.

,, *magellanicus*, Chemnitz. (Station 315, 12 fathoms); obtained also at Station 149 and Fiji.

Modiolarca trapezina (Lamarck). (Station 315, 12 fathoms); obtained also at Stations 145, 149, and 311.

Pecten patagonicus, King. (Station 315, 12 fathoms); obtained also at Station 312.

GASTEROPODA (Watson, Zool. pt. 42).

Fissurella picta (Gmelin). (Station 315, 12 fathoms); obtained at no other locality by the Challenger. Recorded from Magellan Strait, Falkland Islands, and Chili.

Trochus (*Photinula*) *cærulescens* (King). (Station 315, 5 to 12 fathoms); obtained at no other locality by the Challenger. Recorded from Magellan Strait and Falkland Islands.

,, (,,) *expansus* (Sowerby). (Station 315, 5 to 12 fathoms, and Port Louis—from crop of duck); obtained also at Stations 145 and 149.

,, (,,) *tæniatus* (Sowerby). (Stations 315 and 316, 2 to 12 fathoms); obtained at no other locality by the Challenger. Recorded from Magellan Strait, Falkland Islands, and western North America.

Trophon geversianus (Pallas). (Station 315, 12 fathoms); obtained also at Station 151.

,, *liratus*, Couthouy, MS. (Station 315, 12 fathoms); obtained also at Station 308.

Fusus (*Euthria*) *fuscatus* (Bruguière). (Stations 315 and 316, 4 to 12 fathoms); obtained also at Station 149.

Voluta (*Cymbiola*) *ancilla*, Solander. (Station 315, 12 fathoms); obtained at no other locality by the Challenger. Recorded from Patagonia and Magellan Strait.

Crepidula dilatata, Lamarck. (Station 315, 5 to 12 fathoms); obtained at no other locality by the Challenger. Recorded from South America, Magellan Strait, and Falkland Islands.

Calyptræa pileus (Lamarck). (Station 315, 5 to 12 fathoms); obtained at no other locality by the Challenger. Recorded from Falkland Islands and Peru.

,, sp. (?). (Station 315, 5 to 12 fathoms).

Lamellaria, two species undetermined. (Station 315, 5 to 12 fathoms).

Polyzoa (Busk, Zool. pts. 30 and 50; Waters, pt. 79). Falkland Islands.

Menipea benemunita, n.sp. (Station 315, 5 to 12 fathoms); obtained also at Stations 149, 308, 313, and 314.

,, *aculeata* (d'Orbigny). (Station 315, 5 to 12 fathoms); obtained also at Stations 308 and 314.

Caberea minima, n.sp. (Station 315, 5 to 12 fathoms); obtained at no other locality.

Carbasea ovoidea, Busk. (Station 315, 5 to 12 fathoms); obtained also at Stations 145, 149, 308, and 312.

Diachoris magellanica, Busk. (Station 315, 5 to 12 fathoms); obtained also at Port Jackson.

,, *costata*, Busk. (Station 315, 5 to 12 fathoms); obtained at no other locality by the Challenger. Recorded from Australia and Kerguelen.

Salicornaria malvinensis, Busk. (Station 315, 5 to 10 fathoms); obtained also at Stations 145, 149, 176, and 304.

Cribrilina monoceros (Busk). (Station 315, 12 fathoms); for distribution see Station 145.

Microporella malusii (Audouin). (Station 315, 5 to 12 fathoms); obtained also at Station 135.

Lepralia margaritifera (Quoy and Gaimard). (Station 315, 12 fathoms); obtained at no other locality by the Challenger. Recorded from Tierra del Fuego, Falkland Islands, and Kerguelen.

,, *marsupium*, Macgillivray. (Station 315, 12 fathoms); obtained at no other locality by the Challenger. Recorded from Australia.

Chorizopora hyalina, var. *bougainvillei*, Busk. (Station 315, 12 fathoms); obtained also at Stations 135 and 149.

Smittia stigmatophora, n.sp. (Station 315, 12 fathoms); obtained at no other locality. [Waters calls it *Smittia smittiana*, Busk].

Mucronella tricuspis, Hincks. (Station 315, 5 to 12 fathoms); obtained also at Station 145 and the Cape.

Cellepora eatonensis, n.sp. (Station 315, 5 to 12 fathoms); obtained also at Stations 149 and 308. [Waters calls it *Cellepora pumicosa*, var. *eatonensis*].

Tubulipora flabellaris (Fabricius). (Station 315, 12 fathoms); obtained at no other locality by the Challenger. Recorded from European seas and Arctic.

,, *fimbria*, Lamarck. (Station 315, 12 fathoms); obtained at no other locality by the Challenger. Recorded from Arctic, North Atlantic, and Australia.

Falkland Islands.

Brachiopoda (Davidson, Zool. pt. 1).

Magasella flexuosa (King). Six specimens (Station 315, 5 to 12 fathoms); obtained also at Station 312.

Tunicata (Herdman, Zool. pts. 17 and 38).

Molgula gregaria (Lesson). Six specimens (Station 315, 5 to 12 fathoms); obtained at no other locality by the Challenger. Recorded from Falkland Islands and Magellan Strait.

,, *horrida*, n.sp. Two specimens (Station 315, 5 to 12 fathoms); obtained at no other locality.

Boltenia legumen, Lesson. Nine specimens (Stations 315 and 316, 4 to 12 fathoms); obtained also at Station 312.

Colella pedunculata (Quoy and Gaimard). One specimen (Station 315, 12 fathoms); obtained also at Stations 149, 151, 313, and 314.

,, *gaimardi*, n.g., n.sp. Five specimens (Station 315, 5 to 10 fathoms); obtained at no other locality.

Amaroucium pallidulum, n.sp. One specimen (Station 315, 12 fathoms); obtained at no other locality.

Goodsiria pedunculata, n.sp. Two specimens (Station 315, 5 to 12 fathoms); obtained at no other locality.

,, *coccinea*, Cunningham. One specimen (Station 315, 12 fathoms); obtained also at Stations 313 and 314.

Fishes (Günther, Zool. pt. 6).

Eleginus maclovinus, C.V. (Port Stanley); obtained also at Gray's Harbour.

Haplochiton zebra, Jen. (Port Stanley); obtained also at Gray's Harbour and Puerto Bueno.

The Station-book records also a *Doris* from Station 315, 5 to 12 fathoms.

In the foregoing list 85 species of invertebrates and fishes are enumerated, of which 24 are new to science, including representatives of 2 new genera; 15 of the new species were not obtained elsewhere.

Organisms from the Deposit.

Foraminifera (Brady, Zool. pt. 22).—The following species of Foraminifera were observed in the deposit from Stanley Harbour, 6 fathoms:—

Miliolina labiosa (d'Orbigny).
,, *oblonga* (Montagu).
,, *seminulum* (Linné).
Bulimina elegantissima, d'Orbigny.
Lagena acuta (Reuss).
,, *globosa* (Montagu).
,, *lævigata* (Reuss).
,, *lævis* (Montagu).

Lagena marginata (Walker and Boys).
„ *orbignyana* (Seguenza).
„ *striata* (d'Orbigny).
„ *sulcata* (Walker and Jacob).
Nodosaria calomorpha, Reuss.
Patellina corrugata, Williamson.
Truncatulina lobatula (Walker and Jacob).
Pulvinulina karsteni (Reuss).
Rotalia beccarii (Linné).
Polystomella crispa (Linné).
„ *macella* (Fichtel and Moll).
„ *striatopunctata* (Fichtel and Moll).

FALKLAND ISLANDS.

Surface Organisms.—The water in Port Stanley, Port William, and near the land was of a green colour, doubtless arising from the presence of great numbers of Diatoms (chiefly *Coscinodiscus*). In Stanley Harbour the tow-net yielded immense numbers of small beautiful Medusæ.

ORGANISMS FROM SURFACE-NETS.

Station 317 (Sounding 467), Falkland Islands to Rio de la Plata (see Chart 42 and Diagram 22).

STATION 317.

February 8, 1876; lat. 48° 37′ S., long. 55° 17′ W.
Temperature of air at noon, 50°·3; mean for the day, 48°·9.
Temperature of water :—

Surface,	46°·7	200 fathoms,	38·6
25 fathoms,	42·3	300 „	38·0
50 „	40·0	400 „	37·4
75 „	39·6	500 „	36·8
100 „	39·3	Bottom,	35·7

Density at 60° F. :—

Surface,	1·02524	200 fathoms,	1·02523
25 fathoms,	1·02525	300 „	1·02523
50 „	1·02520	400 „	1·02538
100 „	1·02522	Bottom,	1·02531

Depth, 1035 fathoms; deposit, Sandy Gravel, containing 14·61 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 9 A.M. shortened and furled sails, and proceeded under steam to sound and trawl. At 9.30 A.M. stopped and sounded in 1035 fathoms. The sounding-tube contained no trace of the bottom. At 11 A.M. put trawl over and veered 1600 fathoms. Took serial temperatures down to 500 fathoms. The carbonic acid was determined in bottom water, and amounted to 38·5 milligrammes per litre. At 3 P.M. commenced heaving in trawl, but at 3.55 P.M. trawl-rope carried away after the weights had come in. The rope appeared much chafed, indicating the probable stony nature of the bottom. In the tow-net attached to the weights were found a few specimens and some of the deposit,

Station 317.

along with slaty pebbles, phosphatic and glauconitic concretions, and broken shells. This Station is situated about 200 miles N.N.E. of Stanley Harbour. At 4 P.M. made sail. *Diomedea exulans*, molly mauks, stinkers, black night hawks, mutton birds, *Prion turtur*, *Thalassidroma*, and large petrels were seen.

Lobos Island distant at noon, 816 miles. Made good 130 miles. Amount of current 15 miles, direction N. 31° E.

Animals from Tow-Net at Weights.

The following species are recorded in the Zoological Reports from the tow-net at the weights at this Station :—

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Phakellia ventilabrum (Johnston), var. *connexiva*, nov. One specimen; obtained also at Station 122.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha meridionalis, n.sp. Obtained also at Station 320, 600 fathoms.

Ophiophyllum sp. (?). One damaged specimen.

Ostracoda (Brady, Zool. pt. 3).

Cythere dasyderma, n.sp. For distribution see Station 5.

Cirripedia (Hoek, Zool. pt. 25).

Verruca gibbosa, n.sp. Four specimens; obtained at no other locality.

Amphipoda (Stebbing, Zool. pt. 67).

Œdiceroides cinderella, n.g., n.sp. Two specimens; obtained at no other locality.

Lamellibranchiata (Smith, Zool. pt. 35).

Lima (*Limatula*) sp. (?). One specimen.

Brachiopoda (Davidson, Zool. pt. 1).

Terebratula wyvillii, n.sp. One small specimen; obtained also at Stations 160, 184, 244, 299, and 302.

The Station-book records also a piece of a Hydroid, and small Sipunculid.

Excluding Protozoa, about 15 specimens of invertebrates were obtained at this Station, belonging to about 10 species, of which 6 are new to science, including representative of 1 new genus; 2 of the new species were not obtained elsewhere.

Organisms from Surface Nets.

Surface Organisms.—The tow-nets at the surface yielded Diatoms, *Globigerina*, *Sagitta*, Copepods, *Euphausia* and larvæ, and Pteropods, while the tow-net at the weights brought up also some of the deep-sea Radiolaria and deep-sea Amphipods.

Station 318 (Sounding 468), Falkland Islands to Rio de la Plata (see Chart 42 and Diagram 22). STATION 318.

February 11, 1876; lat. 42° 32′ S., long. 56° 29′ W.
Temperature of air at noon, 56°·8; mean for the day, 56°·7.
Temperature of water :—

	°		°
Surface,	57·5	300 fathoms,	35·4
25 fathoms,	56·7	400 „	35·4
50 „	43·2	800 „	35·4
75 „	39·6	900 „	35·4
100 „	36·5	1000 „	35·4
125 „	35·9	1100 „	35·4
150 „	35·6	1200 „	35·4
175 „	35·4	1300 „	35·4
200 „	35·4	1400 „	35·4
225 „	35·4	1500 „	35·4
250 „	35·4	Bottom,	33·7
275 „	35·4		

Density at 60° F. :—

Surface,	1·02524	300 fathoms,	1·02508
25 fathoms,	1·02526	400 „	1·02519
50 „	1·02514	800 „	1·02568
100 „	1·02511	Bottom,	1·02584
200 „	1·02509		

Depth, 2040 fathoms; deposit, Globigerina Ooze, containing 32·69 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.45 A.M. got up steam. At 9 A.M. shortened and furled sails, and proceeded under steam to sound and trawl. At 10 A.M. sounded in 2040 fathoms. Put trawl over. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in surface water, and amounted to 38·5 milligrammes per litre. At 4 P.M. commenced heaving in trawl, which came up at 6 P.M., containing a few Crustaceans, &c., but, although the trawl must have been near, it showed no signs of having touched the bottom. At 7.10 P.M. made sail. Albatrosses, mutton birds, black night hawks, prions, and Thalassidromas were seen.

Lobos Island distant at noon, 456 miles; Valdes Peninsula, east coast of South America, distant about 300 miles. Made good 176 miles. Amount of current 13 miles, direction N. 33° E.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Station 318. Animals from Trawl.

Deep-Sea Medusæ (Haeckel, Zool. pt. 12).

Atolla wyvillii, n.g., n.sp. Several specimens; obtained also at Station 157.

Isopoda (Beddard, Zool. pt. 33).

Serolis neæra, n.sp. One specimen; obtained also at Station 320, 600 fathoms. [Possibly this specimen is recorded in error from this Station, for no mention is made of *Serolis* in any of the note-books].

Macrura (Spence Bate, Zool. pt. 52).

Acanthephyra sica, n.sp. One specimen; for distribution see Station 40.
„ *brachytelsonis*, n.sp. Four specimens; for distribution see Station 170.
Hymenodora mollicutis, n.sp. One specimen; for distribution see Station 87.

Fishes (Günther, Zool. pt. 57).

Bathylagus atlanticus, n.g., n.sp. One specimen; obtained at no other locality. The only other species of the genus (*Bathylagus antarcticus*) was taken at Station 157.

Excluding Protozoa, about a dozen specimens of invertebrates and fishes were obtained at this Station, belonging to 6 species, all of which are new to science, including representatives of 2 new genera; 1 of the new species was not obtained elsewhere.

Organisms from the Deposit.

Radiolaria (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station :—

Aulacantha clavata, Haeckel.
Aulographis ancorata, Haeckel.
„ *martagon*, Haeckel.
„ *asterixcus*, Haeckel.
Oroscena duncanii, Haeckel.
Sagenoscena stellata, Haeckel.
Auloscena verticillus, Haeckel.
Aulastrum tetraceros, Haeckel.
Challengeria pyramidalis, Haeckel.
Entocannula infundibulum, Haeckel.
Gorgonetta carmarina, Haeckel.
Castanarium darwini, Haeckel.
Circospathis novena, Haeckel.
Haeckeliana lamarckiana, Haeckel.
Conchopsis carinata, Haeckel.
Cœloplegma atlanticum, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface and deep tow-nets at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).
Spongocore chrysalis, Haeckel.
Cyphanta hystrix, Haeckel.
Cannocapsa tubulosa, Haeckel.
Hexonaspis hexagona, Haeckel.
Tristylospyris furcata, Haeckel.

Challengeria thomsoni, Murray.
Gazelletta studeri, Haeckel.

Ostracoda (Brady, Zool. pt. 3).

Halocypris atlantica, Lubbock.

Copepoda (Brady, Zool. pt. 23).

Oithona challengerii, n.sp.
Goniopsyllus rostratus, n.g., n.sp.
Corycæus varius, Dana.

Amphipoda (Stebbing, Zool. pt. 67). Station 318.

Podocerus falcatus (Montagu).
Primno sp. (?).

Schizopoda (Sars, Zool. pt. 37).

Thysanoëssa gregaria, n.sp.

Tunicata (Herdman, Zool. pt. 76).

Doliolum ehrenbergi, Krohn.
„ sp., (blastozooids).

In addition, the following are recorded in the note-books :—*Peridinium*, *Globigerina*, *Sagitta*, *Tomopteris*, *Cypridina*, Hyperids, *Euphausia*, *Atlanta*, *Salpa*. The tow-nets at the trawl and weights yielded many deep-sea Radiolaria (*Challengeria*, *Tuscarora*, &c.), along with Crustaceans and very large *Sagittæ* (some over two inches in length).

Station 319 (Sounding 469), Falkland Islands to Rio de la Plata (see Chart 42 and Diagram 22). Station 319.

February 12, 1876 ; lat. 41° 54′ S., long. 54° 48′ W.
Temperature of air at noon, 62°·8 ; mean for the day, 61°·3.
Temperature of water :—

Surface,	59·5	400 fathoms,	38·1
25 fathoms,	52·2	500 „	37·6
50 „	48·2	600 „	37·1
75 „	44·8	700 „	36·8
100 „	43·0	800 „	36·8
125 „	41·6	900 „	36·8
150 „	40·6	1000 „	36·8
175 „	40·0	1100 „	36·8
200 „	39·5	1200 „	36·8
225 „	39·2	1300 „	36·8
250 „	39·0	1400 „	36·8
275 „	38·8	1500 „	36·8
300 „	38·6	Bottom,	32·7

Density at 60° F. at surface, 1·02555 ; bottom, 1·02552.
Depth, 2425 fathoms ; deposit, Blue Mud, containing 6·41 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5 A.M. got up steam. At 6.25 A.M. shortened and furled sails, and proceeded under steam to sound. At 7 A.M. sounded in 2425 fathoms. Took serial temperatures

Station 319. down to 1500 fathoms. At 11.15 A.M. made sail. The same birds as noted at the previous Station were seen, along with a very small species of *Thalassidroma*.

Lobos Island distant at noon, 410 miles. Made good 86 miles. Amount of current 21 miles, direction S. 48° E.

Organisms from Surface Nets. Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Cypassis eucolpos, Haeckel.
Amphibrachium dilatatum, Haeckel.
Larnacospongus larnacillifer, Haeckel.
Challengeria thomsoni, Murray.

Copepoda (Brady, Zool. pt. 23).

Saphirina ovalis, Dana.
,, *inæqualis*, Dana.
,, *reticulata*, n.sp.
Saphirina opaca, Lubbock.
,, *gemma*, Dana.

Amphipoda (Stebbing, Zool. pt. 67).

Primno sp. (?).

Tunicata (Herdman, Zool. pt. 76).

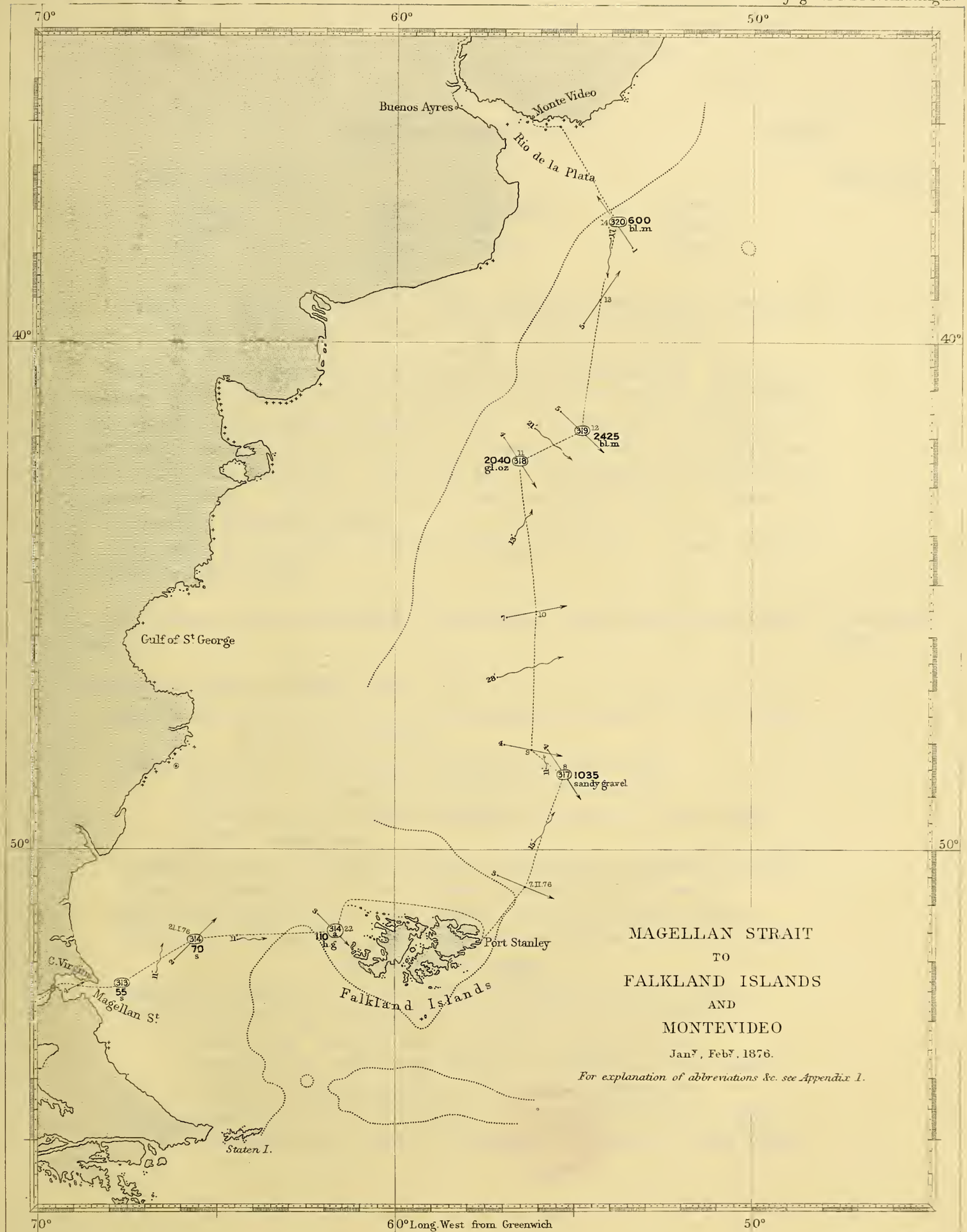
Salpa runcinata - fusiformis, Chamisso—Cuvier.
,, *democratica - mucronata*, Forskål.

In addition, the following are recorded in the note-books :—*Peridinium tripos*, *Globigerina*, Acanthometræ and compound Radiolaria, Medusæ, Ctenophoræ, Echinoderm larvæ, Hyperids, *Phronima*, larvæ of *Euphausia*. The stomachs of the *Salpæ* contained Coccospheres, Diatoms, and *Peridinium*. It was curious to note the absence of the small red Copepods so abundant on the previous day, their place being taken by several species of *Saphirina* and a few blue Copepods. Sharks and flying fishes were seen.

Station 320. **Station 320** (Sounding 407), Falkland Islands to Rio de la Plata (see Chart 42 and Diagram 22).

February 14, 1876 ; lat. 37° 17′ S., long. 53° 52′ W.
Temperature of air at noon, 66°·8 ; mean for the day, 62°·5.
Temperature of water :—

Surface,	67·5	250 fathoms,	39·5
25 fathoms,	60·0	275 ,,	39·3
50 ,,	46·0	300 ,,	39·1
75 ,,	44·0	350 ,,	38·8
100 ,,	43·0	400 ,,	38·4
125 ,,	42·0	450 ,,	38·2
150 ,,	41·0	500 ,,	37·9
175 ,,	40·3	550 ,,	37·6
200 ,,	40·0	Bottom,	37·2
225 ,,	39·8		



MAGELLAN STRAIT TO FALKLAND ISLANDS AND MONTEVIDEO

Jan^{y}, Feb^{y}, 1876.

For explanation of abbreviations &c. see Appendix 1.

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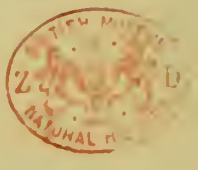


Density at 60° F. :— STATION 320.

Surface,	1·02523	200 fathoms,	1·02531
25 fathoms,	1·02534	400 „	1·02533
50 „	1·02488	Bottom,	1·02541
100 „	1·02562		

Depth, 600 fathoms; deposit, Blue Mud, containing 11·89 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. proceeded under steam and sail, the wind having fallen off. At 8.30 A.M. shortened and furled sails. At 9 A.M. stopped and sounded in 600 fathoms; the sounding-tube contained only a small phosphatic concretion. Put trawl over. Obtained serial temperatures down to bottom. At 11.30 A.M. commenced heaving in trawl, which came up at 12.30 P.M. containing a little mud, five or six phosphatic concretions, and numerous specimens. This was one of the richest hauls made during the cruise. At 2 P.M. proceeded under steam and sail.

Lobos Island distant at noon, 144 miles. Made good 110 miles. Amount of current 17 miles, direction S. 5° W.

The following species are recorded in the Zoological Reports from the trawl at this Station :— ANIMALS FROM TRAWL.

MONAXONIDA (Ridley and Dendy, Zool. pt. 59).

Halichondria latrunculioides, n.sp. Three specimens; obtained at no other locality.
„ sp. (?). Two specimens.
Gellius lævis, n.sp. Two specimens; obtained at no other locality.
„ *calyx*, n.sp. One specimen; obtained at no other locality.
„ *flabelliformis*, n.sp. Several specimens; obtained at no other locality.
„ sp. (?). One specimen.
Tedania massa, n.sp. Numerous specimens; obtained also at Stations 163 and 313.
Vomerula esperioides, n.sp. One specimen; obtained also at Station 142.
Esperella lapidiformis, n.sp. One specimen; obtained at no other locality.
Phelloderma radiatum, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.
Amphilectus annectens, n.sp. One specimen; obtained at no other locality.
Myxilla spongiosa, n.sp. One specimen; obtained at no other locality.
„ *hastata*, n.sp. One specimen; obtained at no other locality.
„ *compressa*, n.sp. Six or eight specimens; obtained at no other locality.
„ *nobilis*, n.sp. Three specimens; obtained also at Station 148.
Ciocalypta hyaloderma, n.sp. Four specimens; obtained at no other locality.
„ *amorphosa*, n.sp. Five or six specimens; obtained at no other locality.

Station 320.

Axinella (?) *tubulosa*, n.sp. One specimen ; obtained at no other locality.
Suberites caminatus, n.sp., var. Several specimens ; obtained also Station 145.
,, *axiatus*, n.sp. A few specimens ; obtained at no other locality.
Latrunculia apicalis, n.sp. Two specimens ; obtained also at Station 149.
,, *brevis*, n.sp. Ten specimens ; obtained at no other locality.

Tetractinellida (Sollas, Zool. pt. 63).

Tetilla leptoderma, n.sp. Six specimens ; obtained at no other locality.

Hexactinellida (Schulze, Zool. pt. 53).

Rossella antarctica, Carter. Several specimens ; obtained also at Stations 145, 149, and 150.

Alcyonaria (Wright and Studer, Zool. pt. 64).

Primnoisis rigida, n.g., n.sp. Obtained at no other locality.
Stenella acanthina, n.sp. Several specimens ; obtained at no other locality.
Primnoella magellanica, Studer. Obtained at no other locality by the Challenger. Recorded from Magellan Strait.
,, *murrayi*, n.sp. Obtained at no other locality.
Sympodium verrilli, n.sp. Obtained at no other locality.

Pennatulida (Kölliker, Zool. pt. 2).

Anthoptilum thomsoni, n.g., n.sp. Nine specimens ; obtained at no other locality.

Actiniaria (Hertwig, Zool. pt. 73).

Phellia spinifera, n.sp. One specimen ; obtained also at Station 311.

Corals (Moseley, Zool. pt. 7).

Sporadopora dichotoma, n.g., n.sp. Many specimens ; obtained at no other locality. Only species of the genus.
Errina labiata, n.sp. Several specimens ; obtained also at Station 135.
Spinipora echinata, n.g., n.sp. Two specimens ; obtained at no other locality. Only species of the genus.
Stylaster densicaulis, n.sp. Two or three specimens ; obtained at no other locality.
Allopora profunda, n.sp. Two specimens ; obtained at no other locality.
Cryptohelia pudica, M.-Edwards and Haime. Many specimens ; for distribution see Station 3.
Cyathoceras cornu, n.g., n.sp. One specimen ; obtained also at Station 163. The only other species of the genus (*Cyathoceras rubescens*) was taken at Station 192.

Flabellum curvatum, n.sp. Eight specimens ; obtained at no other locality. Station 320.

Bathelia candida, n.g., n.sp. Several specimens ; obtained at no other locality. Only species of the genus.

Cladocora debilis, M.-Edwards and Haime. One specimen ; obtained at no other locality by the Challenger.

Hydroida (Allman, Zool. pt. 70).

Sertularia clausa, n.sp. Obtained at no other locality.

Siphonophoræ (Haeckel, Zool. pt. 77).

Rhodalia miranda, n.g., n.sp. Four specimens ; obtained at no other locality. Only species of the genus.

Crinoidea (Carpenter, Zool. pt. 60).

Antedon lineata, n.sp. Obtained at no other locality.

„ *longipinna*, n.sp. Three specimens ; obtained at no other locality.

„ *angustipinna*, n.sp. One specimen ; obtained at no other locality.

Asteroidea (Sladen, Zool. pt. 51).

Ctenodiscus australis (Lovén, MS.), Lütken. Several specimens ; obtained also at Station 313.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha meridionalis, n.sp. Several specimens ; obtained also at Station 317.

„ *confragosa*, n.sp. Several specimens ; obtained also off coast of Portugal.

Ophiacantha vivipara, Ljungman. Several specimens ; obtained also at Stations 145, 149, 151, 313, and 314.

Ophiochondrus stelliger, n.sp. Several specimens ; obtained at no other locality.

Echinoidea (Agassiz Zool. pt. 9).

Dorocidaris (*Cidaris*) *papillata*, Leske. For distribution see Station 24.

Holothurioidea (Théel, Zool. pt. 39).

Trochostoma (?) sp. One incomplete specimen.

Psolus murrayi, n.sp. One specimen ; obtained at no other locality.

„ *operculatus*, Pourtalès. Several specimens ; obtained also at Station 49.

„ *antarcticus*, Philippi. One specimen ; obtained also at Station 308.

Station 320.

Annelida (M'Intosh, Zool. pt. 34).

Eulagisca corrientis, n.g., n.sp. One specimen; obtained also at Station 150. Only species of the genus.

Lænilla fusca, n.sp. One specimen; obtained at no other locality.

Syllis robertianæ, n.sp. One specimen; obtained at no other locality.

Hyalinœcia tubicola, Müller, var. Numerous specimens; the species obtained also at Stations 75, 167 (var.), 186 (var.), and 235.

Pista mirabilis, n.sp. Several specimens; obtained at no other locality.

„ *corrientis*, n.sp. One specimen; obtained at no other locality.

Sabella assimilis, n.sp. Several specimens; obtained at no other locality.

Cirripedia (Hoek, Zool. pt. 25).

Scalpellum parallelogramma, n.sp. Twelve specimens; obtained at no other locality.

„ *triangulare*, n.sp. Four specimens; obtained at no other locality.

Amphipoda (Stebbing, Zool. pt. 67).

Eusiroides crassi, n.g., n.sp. Several specimens; obtained at no other locality.

Elasmopus delaplata, n.sp. Several specimens; obtained at no other locality.

Isopoda (Beddard, Zool. pts. 33 and 48).

Serolis neœra, n.sp. Several specimens; obtained also at Station 318 (?).

Stenetrium haswelli, n.sp. One specimen; obtained at no other locality.

Arcturus anna, n.sp. One specimen; obtained at no other locality.

Schizopoda (Sars, Zool. pt. 37).

Euphausia similis, n.sp. One specimen (probably from intermediate depths); obtained at no other locality.

Macrura (Spence Bate, Zool. pt. 52).

Sergestes atlanticus, M.-Edwards. One specimen; for distribution see Station 42.

Pandalopsis amplus, n.g., n.sp. Six specimens; obtained at no other locality. Only species of the genus.

Anomura (Henderson, Zool. pt. 69).

Paralomis formosus, n.sp. Four specimens; obtained at no other locality.

Munida subrugosa (White). One specimen; for distribution see Station 304.

„ *spinosa*, n.sp. Several specimens; obtained also at Station 145.

PYCNOGONIDA (Hoek, Zool. pt. 10). STATION 320.

Phoxichilidium patagonicum, n.sp., var. *elegans*, nov. Several specimens; the species obtained also at Stations 304, 308, and 313.

LAMELLIBRANCHIATA (Smith, Zool. pt. 35).

Neæra platensis, n.sp. Obtained at no other locality.

GASTEROPODA (Watson, Zool. pt. 42).

Trochus (*Margarita*) sp. (?).

Pleurotoma (*Surcula*) *goniodes*, n.sp. Obtained at no other locality.

CEPHALOPODA (Hoyle, Zool. pt. 44).

Eledone brevis, n.sp. Three specimens; obtained at no other locality.

POLYZOA (Busk, Zool. pts. 30 and 50; Waters, pt. 79).

Caberea crassimarginata, n.sp. Obtained at no other locality.

Bugula reticulata, n.sp. Obtained also at Stations 147, 299, and 308.

Ichthyaria oculata, n.g., n.sp. Obtained also at Station 314. Only species of the genus.

Membranipora galeata, Busk, var. *erecta*, nov. The species obtained also at Stations 75, 145, 149, 150, and the Cape.

,, *umbonata*, Busk, var. nov., Waters. (Growing on *Ascidia meridionalis*).

Foveolaria (?) *elliptica*, n.g., n.sp. Obtained also at Station 162.

,, *falcifera*, n.g., n.sp. Obtained at no other locality. [Waters calls it *Membranipora falcifera* (Busk)].

Vincularia labiata, n.sp. Obtained at no other locality. [Waters calls it *Thalamoporella labiata* (Busk)].

Bifaxaria abyssicola, n.g., n.sp. (?). Obtained also at Station 253.

,, *denticulata*, n.g., n.sp. Obtained at no other locality.

Salicornaria dubia, n.sp. Obtained at no other locality.

Melicerita atlantica, n.sp. Obtained at no other locality.

,, (?) *dubia*, n.sp. Obtained at no other locality.

Retepora magellensis, n.sp. Obtained at no other locality by the Challenger. Recorded from Falkland Islands.

Turritigera stellata, n.g., n.sp. Obtained also at Station 142. Only species of the genus.

Cribrilina latimarginata, n.sp. Obtained at no other locality.

,, *monoceros* (Busk). For distribution see Station 145.

Station 320.

Smittia smittiana, n.sp. Obtained at no other locality.

Myriozoum immersum, n.sp. Obtained at no other locality. [Waters calls it *Schizoporella challengeria*, n.n.].

„ *simplex*, n.sp. Obtained at no other locality.

Cellepora rudis, n.sp. Obtained at no other locality.

Crisia acuminata, n.sp. Obtained at no other locality.

Idmonea marionensis, Busk. Obtained also at Stations 145, 147, and 151.

„ *fissurata*, n.sp. Obtained at no other locality.

Hornera lichenoides (Linné). Obtained at no other locality by the Challenger. Recorded from North Atlantic and Arctic.

Brachiopoda (Davidson, Zool. pt. 1).

Terebratula uva, Broderip. Two specimens; obtained also at Stations 150 and 163.

Tunicata (Herdman, Zool. pts. 17 and 38).

Molgula pyriformis, n.sp. One specimen; obtained at no other locality.

Styela oblonga, n.sp. One specimen; obtained at no other locality.

„ *flava*, n.sp. One specimen; obtained at no other locality.

„ *glans*, n.sp. One specimen; obtained at no other locality.

Ascidia meridionalis, n.sp. Several specimens; obtained also at Station 313.

„ *tenera*, n.sp. Two specimens; obtained also at Station 311.

Hypobythius moseleyi, n.g., n.sp. One specimen; obtained at no other locality. The only other species of the genus (*Hypobythius calycodes*) was taken at Station 248.

Polycarpa aspera, n.sp. One specimen; obtained at no other locality.

Polyclinum molle, n.sp. One specimen; obtained at no other locality.

Aplidium incrustans, n.sp. Several specimens; obtained at no other locality.

Psammaplidium effrenatum, n.g., n.sp. Two specimens; obtained at no other locality.

„ *flavum*, n.g., n.sp. One specimen; obtained at no other locality.

Leptoclinum tenue, n.sp. One specimen; obtained also at Stations 308 and 311.

Calocormus huxleyi, n.g., n.sp. One specimen obtained at no other locality. Only species of the genus.

Fishes (Günther, Zool. pt. 57).

Haloporphyrus ensiferus, n.sp. Four specimens; obtained at no other locality.

Antimora rostrata, n.g., n.sp. One specimen; obtained also at Station 146.

Macrurus holotrachys, n.sp. One specimen; obtained at no other locality.

In addition to the foregoing, the following are recorded in the Station-book:—Many specimens of *Palythoa*, *Borlasia* (cf.), and *Maia*.

Excluding Protozoa, nearly 500 specimens of invertebrates and fishes were obtained at this Station, belonging to about 127 species, of which 103 are new to science, including representatives of 19 new genera; 80 of the new species and 6 new genera were not obtained elsewhere. Station 320.

Surface Organisms.—The following species are recorded from the surface at this Station :— Organisms from Surface-Nets.

Copepoda (Brady, Zool. pt. 23).

Calanus propinquus, n.sp.
Rhincalanus gigas, n.sp.
Pleuromma abdominale (Lubbock).
Heterochæta spinifrons, Claus.

Schizopoda (Sars, Zool. pt. 37).

Thysanoëssa macrura, n.sp.

Tunicata (Herdman, Zool. pt. 76).

Salpa cordiformis-zonaria, Quoy and Gaimard—Pallas.

In addition, the following are recorded in the note-books :—*Peridinium*, *Globigerina*, Acanthometræ and compound Radiolaria, *Carchesium* and other Infusoria, Medusæ, Siphonophoræ, *Sagitta*, Annelid larvæ, Hyperids and other Amphipods, *Squilla* larvæ, *Mysis*, *Euphausia*, *Amphion* (?), Zoëæ, *Appendicularia*. The tow-net at the weights gave some deep-sea Radiolaria (*Challengeria*, &c.), large *Sagittæ*, and other things.

The Challenger remained at Monte Video from the afternoon of February 15 till 5 A.M. on February 25, 1876 (see *Narr. Chall. Exp.*, vol. i. p. 907). The water off Monte Video was of a reddish or fawn colour, and contained a few Diatoms and Copepods. At Monte Video.

Station 321 (Sounding 471), Rio de la Plata to Tristan da Cunha. Station 321.

February 25, 1876 ; lat. 35° 2′ S., long. 55° 15′ W.
Temperature of air at noon, 79°·8 ; mean for the day, 73°·9.
Temperature of water at surface, 73°·5.
Depth, 13 fathoms ; deposit, Blue Mud, containing 1·13 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5 A.M. weighed anchor, swung ship, and then proceeded down the river. At 4 P.M. stopped and put over trawl in 13 fathoms, which came up at 5 P.M. with a large quantity of tenaceous mud and numerous specimens. Position of Station about 8 miles south of Punta Negra at the mouth of the Rio de la Plata.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Station 321. Animals from Trawl.

Pennatulida (Kölliker, Zool. pt. 2).

Remilla mülleri, Schultze. Numerous specimens; obtained at no other locality by the Challenger.

Actiniaria (Hertwig, Zool. pt. 15).

Cerianthus americanus, Verrill. One specimen and numerous tubes; obtained at no other locality by the Challenger.

Nemertea (Hubrecht, Zool. pt. 54).

Cerebratulus sp. (?). One fragmentary specimen.

Ostracoda (Brady, Zool. pt. 3).

Cytherella polita, Brady. Obtained also in Wellington Harbour, N.Z.

Isopoda.

One specimen, genus and species undetermined. (Off Monte Video).

Macrura (Spence Bate, Zool. pt. 52).

Philonicus (*Pleoticus*) *mülleri*, n.g., n.sp. Thirty specimens; obtained at no other locality.

Artemesia longinaris, n.g., n.sp. Thirty-nine specimens; obtained also at Station 113 (?). Only species of the genus.

Lamellibranchiata (Smith, Zool. pt. 35).

Mactra isabelleana, d'Orbigny. Obtained at no other locality by the Challenger. Recorded from mouth of River Plate.

Periploma compressa, d'Orbigny. Obtained at no other locality by the Challenger. Recorded from Patagonia.

Tellina (*Macoma*) *uruguayensis*, n.sp. Obtained at no other locality by the Challenger. Recorded from West Indies.

Cytherea (*Caryatis*) *rostrata*, Koch. Obtained at no other locality by the Challenger. Recorded from Patagonia and Brazil (?).

Nucula uruguayensis, Smith. Six specimens; obtained at no other locality by the Challenger.

Gasteropoda (Watson, Zool. pt. 42).

Bullia (*Buccinanops*) *gradata* (Deshayes). Obtained at no other locality by the Challenger. Recorded from east and west coasts of South America.

Voluta (*Zidona*) *angulata*, Swainson. Two specimens ; obtained at no other locality by the Challenger. Recorded from east coast of South America. Station 321.

Pleurotoma (*Surcula*) *oxytropis*, Sowerby, var. *albicarinata*, Sowerby. Obtained at no other locality by the Challenger. Recorded from Panama and Mexico.

Nudibranchiata (Bergh, Zool. pt. 26).

Marionia occidentalis, n.sp. One specimen ; obtained at no other locality.

Cephalopoda (Hoyle, Zool. pt. 44).

Loligo brasiliensis, Blainville. Many specimens ; obtained at no other locality by the Challenger. Recorded from Brazil, Antilles, and Cuba.

Fishes (Günther, Zool. pt. 6).

Raja platana, n.sp. Obtained at no other locality.

„ *microps*, n.sp. Obtained at no other locality.

Ancylodon atricauda, n.sp. Obtained at no other locality.

Otolithus guatucupa, C.V. Obtained at no other locality by the Challenger.

Micropogon ornatus, n.sp. Obtained at no other locality.

„ *undulatus*, Linné. (Monte Video) ; obtained at no other locality by the Challenger.

Læmonema longifilis, n.sp. Obtained at no other locality.

Aphoristia ornata, Lac. Obtained at no other locality by the Challenger.

Arius commersoni, Lac. (Monte Video) ; obtained at no other locality by the Challenger.

Engraulis olida, Günther. Obtained at no other locality by the Challenger.

In addition to the foregoing, the following are recorded in the Station-book :—Many Annelids in tubes of various forms, and *Dentalium*.

Excluding Protozoa, over 150 specimens of invertebrates and fishes were obtained at this Station, belonging to about 29 species, of which 9 are new to science, including representatives of 2 new genera ; 8 of the new species were not obtained elsewhere.

Surface Organisms.—The following are recorded in the note-books from the surface at this Station :—*Peridinium*, small Acanthometræ, Medusæ, Ctenophoræ (*Beroë*), *Sagitta*, Annelid larvæ, Copepods, Cirriped larvæ, Zoëæ, *Appendicularia*, and larval fishes. The water was of a greenish colour. Organisms from Surface-Nets.

Station 322.

Station 322 (Sounding 472), Rio de la Plata to Tristan da Cunha (see Chart 16).

February 26, 1876 ; lat. 35° 20′ S., long. 53° 42′ W.
Temperature of air at noon, 70°·8 ; mean for the day, 71°·3.
Temperature of water at surface, 71°·5.
Density at 60° F. at surface, 1·02288.
Depth, 21 fathoms ; deposit, Sand and Shells.

At 9 A.M. stopped and sounded in 21 fathoms. Put over trawl, which came up at 10 A.M. with a few specimens. Position of Station about 60 miles E.S.E. of Lobos Island, off the Rio de la Plata. Proceeded under steam. Shortly after, the wind shifting, proceeded under sail. Sea phosphorescent after sunset. Molly mauks and large black petrels were seen about the ship.

Tristan da Cunha distant at noon, 2000 miles. Made good 135 miles from Monte Video. No current.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Actiniaria (Hertwig, Zool. pt. 73).

Epizoanthus elongatus, n.sp. Five specimens ; obtained at no other locality.

Annelida (M'Intosh, Zool. pt. 34).

Terebella (*Lanice*) *seticornis*, n.sp. Tube only ; obtained at no other locality.

Lamellibranchiata (Smith, Zool. pt. 35).

Mytilus edulis, Linné. Obtained also at Station 315 and New Zealand.

Plicatula ramosa, Lamarck. Obtained at no other locality by the Challenger. Recorded from West Indies.

Fishes (Günther, Zool. pt. 6).

Percophis brasilianus, Quoy and Gaimard. Obtained at no other locality by the Challenger.

Prionotus punctatus, Bl. Obtained at no other locality by the Challenger.

The Station-book records also Hydroids, *Serpulæ*, and worm-tubes, on the shells.

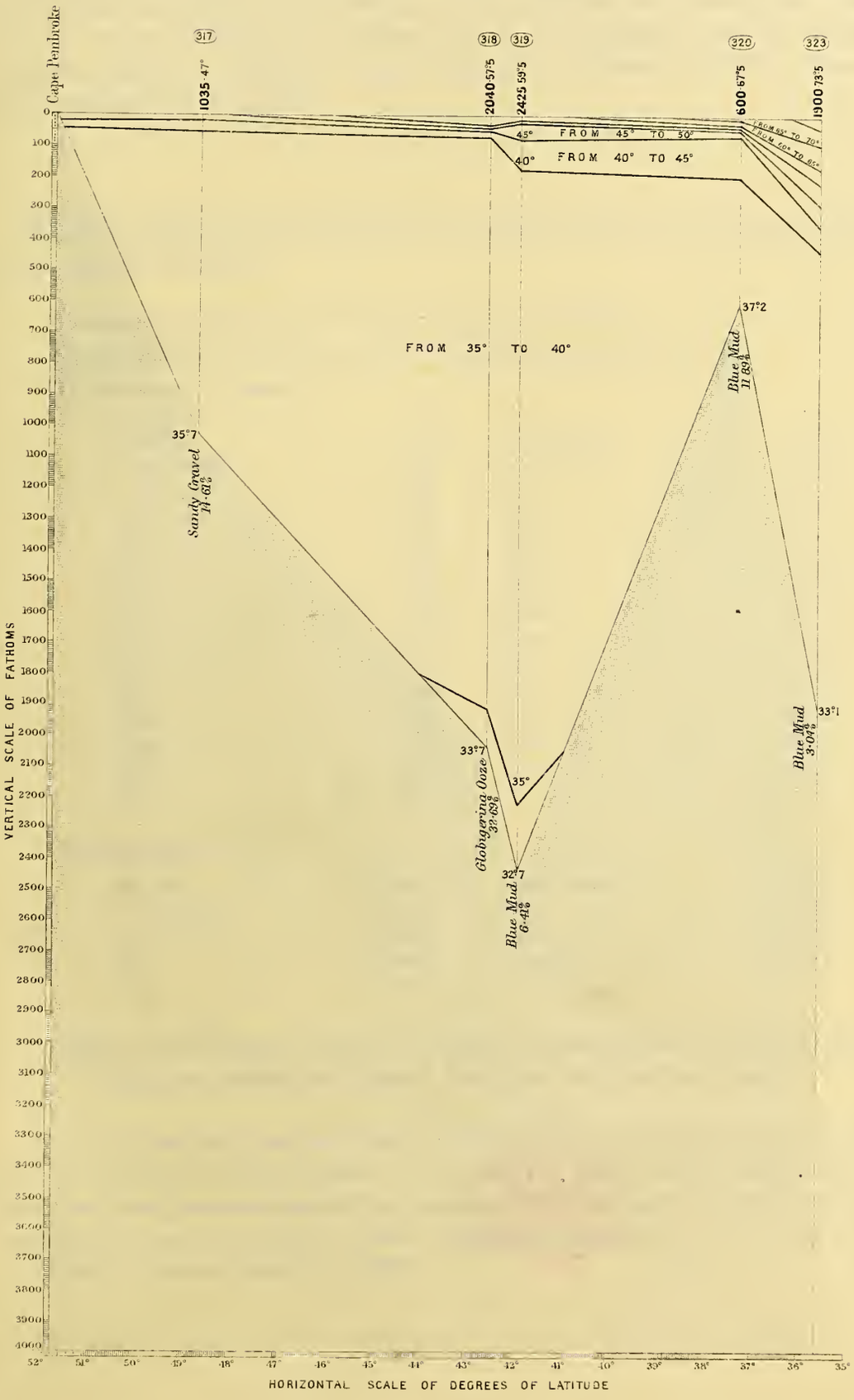
Excluding Protozoa, about 20 specimens of invertebrates and fishes were obtained at this Station, belonging to about 9 species, of which 2 are new to science, and were not obtained elsewhere.

ATLANTIC OCEAN

Meridional Temperature Section

Falkland Islands to the Parallel of 35°40′ S.

For explanation of Symbols see Appendix I.



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NATURAL HISTORY

Surface Organisms.—Young Pleuronectids (*Solea* ?) are recorded by Günther (Zool. pt. 78) from the surface at this Station, and in addition the following are recorded in the note-books:—*Peridinium*, Diatoms, many Acanthometræ and other Radiolaria, Infusoria, Medusæ, *Sagitta*, many Daphnids, Copepods, Cirriped larvæ, Zoëæ, *Appendicularia*, fish eggs, &c. STATION 322. ORGANISMS FROM SURFACE-NETS.

Station 323 (Sounding 473), Rio de la Plata to Tristan da Cunha (see Chart 16, and Diagrams 6 and 22). STATION 323.

February 28, 1876; lat. 35° 39′ S., long. 50° 47′ W.
Temperature of air at noon, 73°·8; mean for the day, 72°·3.
Temperature of water:—

	°		°
Surface,	73·5	600 fathoms,	37·8
25 fathoms,	71·5	700 „	37·0
50 „	69·5	800 „	37·0
75 „	67·5	900 „	37·0
100 „	65·5	1000 „	37·0
125 „	63·5	1100 „	37·0
150 „	61·5	1200 „	37·0
175 „	59·5	1300 „	37·0
200 „	57·5	1400 „	37·0
225 „	55·5	1500 „	37·0
250 „	53·5	1600 „	36·3
275 „	51·5	1725 „	34·8
300 „	49·5	1825 „	33·8
400 „	42·0	Bottom,	33·1
500 „	38·9		

Density at 60° F.:—

Surface,	1·02670	300 fathoms,	1·02579
25 fathoms,	1·02671	400 „	1·02643
50 „	1·02684	800 „	1·02657
100 „	1·02661	Bottom,	1·02641
200 „	1·02616		

Depth, 1900 fathoms; deposit, Blue Mud, containing 3·04 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5 A.M. shortened and furled sails, and proceeded under steam to sound and trawl. At 6 A.M. sounded in 1900 fathoms. At 7 A.M. put trawl over and veered 2500 fathoms. Took serial temperatures down to the bottom. The carbonic acid was determined in the bottom water, and amounted to 43·0 milligrammes per litre. At 1 P.M. commenced

Station 323. heaving in trawl, which came up at 3 P.M. with many specimens. Made sail. Mutton birds and black night hawks (?) were seen.

Tristan da Cunha distant at noon, 1870 miles. Made good 89 miles. Amount of current 4 miles, direction N. 43° E.

Animals from Trawl. The following species are recorded in the Zoological Reports from the trawl at this Station :—

Hexactinellida (Schulze, Zool. pt. 53).

Hyalonema tenue, n.sp. Two fragments ; obtained at no other locality.

Antipatharia (Brook, Zool. pt. 80).

Schizopathes crassa, n.g., n.sp. One specimen ; obtained at no other locality.

Corals (Moseley, Zool. pt. 7).

Leptopenus discus, n.g., n.sp. One specimen ; obtained also at Stations 147 and 157. The only other species of the genus (*Leptopenus hypocælus*) was taken at Station 299.

Siphonophoræ (Haeckel, Zool. pt. 77).

Bathyphysa gigantea, n.sp. Obtained at no other locality.

Crinoidea (Carpenter, Zool. pt. 32).

Rhizocrinus lofotensis, Sars. Stem fragment ; obtained also at Stations 24 and 122.

Asteroidea (Sladen, Zool. pt. 51).

Pythonaster murrayi, n.g., n.sp. Obtained at no other locality. Only species of the genus.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophiomusium archaster, Wyville Thomson, MS., n.sp. Five specimens ; obtained at no other locality.

Echinoidea (Agassiz, Zool. pt. 9).

Aceste bellidifera, Wyville Thomson, n.g., n.sp. Obtained also at Stations VIII. and 272. Only species of the genus.

Gephyrea (Selenka, Zool. pt. 36).

Phascolosoma catharinæ, Müller. One specimen ; obtained at no other locality by the Challenger. Recorded from Desterro (shore).

Ostracoda (Brady, Zool. pt. 3). Station 323.

Argillæcia eburnea, n.sp. Obtained also at Station 149.
Cythere squalidentata, n.sp. Obtained at no other locality.
Krithe tumida, n.sp. Obtained at no other locality.
Xestoleberis expansa, n.sp. Obtained at no other locality.
Pseudocythere caudata, Sars. Obtained also at Stations 145 and 149.

Cirripedia (Hoek, Zool. pt. 25).

Verruca quadrangularis, n.sp. Seven specimens; obtained at no other locality.

Amphipoda (Stebbing, Zool. pt. 67).

Orchomene abyssorum, n.sp. One specimen; obtained at no other locality.

Isopoda (Beddard, Zool. pt. 48).

Neotanais americanus, n.g., n.sp. One specimen; obtained also at Station 45. Only species of the genus.

Macrura (Spence Bate, Zool. pt. 52).

Aristeus armatus, n.sp. One specimen; obtained also at Stations 133, 148, 213, 237, 246, and 276.
Benthesicymus brasiliensis, n.g., n.sp. Four specimens; obtained also at Stations 168, 173, 181, 184, and 285.

Lamellibranchiata (Smith, Zool. pt. 35).

Glomus nitens, Jeffreys. Obtained at no other locality by the Challenger. Recorded from North Atlantic.

Scaphopoda and Gasteropoda (Watson, Zool. pt. 42).

Dentalium amphialum, n.sp. Two specimens; obtained at no other locality.
Trochus sp. (?).
Basilissa simplex, n.g., n.sp. Obtained at no other locality.

Polyzoa (Busk, Zool. pt. 30).

Cellularia crateriformis, n.sp. Obtained also at Station 325, 2650 fathoms.
Bugula margaritifera, n.sp. Obtained also at Station 332, 2200 fathoms.
Farciminaria cribraria, n.sp. Obtained at no other locality.
,, *magna*, n.sp., var. *armata*, nov. The species obtained also at Stations 153 and 325.
Salicornaria magnifica, n.sp. Obtained also at Stations 13, 122, and 157.

Station 323

Fishes (Günther, Zool. pt. 57).

Macrurus filicauda, n.sp. One specimen; obtained also at Stations 146, 157, 158, 299, and 325.

„ *affinis*, n.sp. Two specimens; obtained at no other locality.

In addition to the foregoing, the following are recorded in the Station-book:—Actinian attached to *Dentalium*, Hydroid attached to *Rhizocrinus* stem, four Holothurians of one species, and *Arenicola* (?). The netting of the trawl was covered with the branching Rhizopod *Rhizammina algæformis*.

Excluding Protozoa, about 80 specimens of invertebrates and fishes were obtained at this Station, belonging to about 34 species, of which 25 are new to science, including representatives of 7 new genera; 14 of the new species and 1 new genus were not obtained elsewhere.

Organisms from the Deposit.

The following species of Pteropoda, Foraminifera, and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

Pteropoda (Pelseneer, Zool. pt. 65).

Clio pyramidata, Linné.

Cavolinia inflexa, Lesueur.

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 66 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
„ „ var. *murrhyna*, Schwager.
Miliolina seminulum (Linné).
„ *trigonula* (Lamarck).
Cornuspira foliacea (Philippi).
Pelosina cylindrica, Brady (?).
„ *rotundata*, Brady (?).
Storthosphæra albida, Schulze.
Bathysiphon filiformis, Sars.
„ sp. (?).
Psammosphæra fusca, Schulze.
Hyperammina elongata, Brady.
„ *ramosa*, Brady.
„ sp. (?).
Marsipella cylindrica, Brady.
„ *elongata*, Norman.
Rhabdammina abyssorum, Sars.
„ *linearis*, Brady.
Aschemonella catenata (Norman) (?).
Rhizammina algæformis, Brady.
Reophax adunca, Brady.
„ *dentaliniformis*, Brady.
„ *difflugiformis*, Brady.
Reophax distans, Brady.
„ *fusiformis* (Williamson).
„ *guttifera*, Brady.
„ *membranacea*, Brady.
„ *nodulosa*, Brady.
„ *pilulifera*, Brady.
„ sp. (?).
Haplophragmium agglutinans (d'Orbigny).
„ *anceps*, Brady.
„ *canariense* (d'Orbigny).
„ *foliaceum*, Brady.
„ *fontinense*, Terquem.
„ *globigeriniforme* (Parker and Jones).
„ *rotulatum*, Brady.
„ *tenuimargo*, Brady.
„ *turbinatum*, Brady (?).
Placopsilina bulla, Brady.
„ *cenomana*, d'Orbigny.
Thurammina albicans, Brady.
„ *papillata*, Brady.
Hormosina globulifera, Brady.
„ *ovicula*, Brady.

Ammodiscus charoides (Jones and Parker).
„ *gordialis* (Jones and Parker).
„ *spectabilis*, Brady (?).
Trochammina inflata (Montagu).
„ *pauciloculata*, Brady.
„ *ringens*, Brady.
„ *trullissata*, Brady.
Webbina clavata, Jones and Parker.
„ *hemisphærica*, Jones, Parker, and Brady.
Cyclammina orbicularis, Brady.
„ *pusilla*, Brady.
Verneuilina propinqua, Brady.
Gaudryina pupoides, d'Orbigny.
Clavulina communis, d'Orbigny.
Bulimina affinis, d'Orbigny.
Bolivina punctata, d'Orbigny.
Lagena acuta, Reuss.
„ *formosa*, Schwager, var. *comata*, Brady.
„ *gracilis*, Williamson.
„ *gracillima* (Seguenza).
„ *lævis* (Montagu).
„ *longispina*, Brady.
„ *marginata* (Walker and Boys).
„ *quadricostulata*, Reuss.
„ sp. (?).
Nodosaria (*Glandulina*) *æqualis*, Reuss.
„ *filiformis*, d'Orbigny (?).
Lingulina carinata, d'Orbigny, var. *seminuda*, Hantken. STATION 323.
Cristellaria gibba, d'Orbigny.
„ *mamilligera*, Karrer.
„ *reniformis*, d'Orbigny.
Uvigerina angulosa, Williamson.
„ *asperula*, Czjzek.
„ „ var. *auberiana*, d'Orbigny.
„ *pygmæa*, d'Orbigny.
× *Globigerina bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *inflata*, d'Orbigny.
× „ *rubra*, d'Orbigny.
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
Pullenia quinqueloba, Reuss.
Sphæroidina bulloides, d'Orbigny.
Spirillina decorata, Brady.
Truncatulina akneriana (d'Orbigny).
„ *lobatula* (Walker and Jacob).
„ *pygmæa*, Hantken.
× *Pulvinulina menardii* (d'Orbigny).
× „ „ var. *fimbriata*, Brady.
× „ *micheliniana* (d'Orbigny).
× „ *patagonica* (d'Orbigny).
Rotalia broeckhiana, Karrer.
„ *soldanii*, d'Orbigny.

RADIOLARIA (Haeckel, Zool. pt. 40).

Cenosphæra rosetta, Haeckel.
Xiphosphæra euphrosyne, Haeckel.
Hexalonche geometrica, Haeckel.
Larnacoma lentellipticum, Haeckel.
Trizonium pleurobelonium, Haeckel.
Staurotholus quadratus, Haeckel.
Aegospyris octospina, Haeckel.
Gorgospyris liriope, Haeckel.
Acanthocorys furcata, Haeckel.
Catinulus quadrifidus, Haeckel.
Circospathis tetrodonta, Haeckel.
Haeckeliana lamarckiana, Haeckel.

Surface Organisms.—The following species are recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Larcarium polystylum, Haeckel.
Aulographis bovicornis, Haeckel.
Challengeria thomsoni, Murray.

PTEROPODA (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *acicula* (Rang).

TUNICATA (Herdman, Zool. pt. 76).

Salpa democratica - mucronata, Forskål.

In addition, the following are recorded in the note-books : — *Globigerina*, Acanthometræ and compound Radiolaria, *Carchesium*, Siphonophoræ, *Sagitta*,

Station 323. *Distomum*, *Tomopteris*, Annelid larvæ (like *Balanoglossus*), small Planarian, *Saphirina* and other Copepods, Hyperids, larvæ of *Sergestes* and *Lucifer* (?) and other Decapod larvæ, *Ianthina* and other small shells and egg-clusters (of *Ianthina* ?), *Atlanta* and other Heteropods, various species of Pteropods, *Appendicularia*, *Doliolum*, and larval fishes. A tow-net sent down to 150 fathoms yielded a few Oscillatoriaceæ, a single *Pulvinulina*, *Tomopteris*, and *Cypridina*. The tow-net at the weights and one of the tow-nets at the trawl were full of mud, but the second tow-net at the trawl had very little mud in it, and contained many arenaceous and other Foraminifera (*Globigerina* and *Pulvinulina menardii*), some of the larger specimens of the latter being quite surrounded by sarcode, while some of the bottom-living forms (such as *Discorbina* and *Rupertia*) were alive and attached to the surface of Polyzoa and worm-tubes; the tow-net contained besides large living Challengeridæ, large *Sagittæ*, red shrimps, and other surface and deep-water organisms.

Station 324. **Station 324** (Sounding 474), Rio de la Plata to Tristan da Cunha (see Chart 16 and Diagram 6).

February 29, 1876; lat. 36° 9′ S., long. 48° 22′ W.

Temperature of air at noon, 67°·0; mean for the day, 69°·5.

Temperature of water:—

Surface,	71·5	600 fathoms,	38·1
10 fathoms,	69·7	700 „	37·5
20 „	69·6	800 „	37·0
30 „	69·5	900 „	37·0
40 „	69·3	1000 „	37·0
50 „	68·8	1100 „	37·0
75 „	64·0	1200 „	37·0
100 „	60·0	1300 „	37·0
125 „	56·5	1400 „	37·0
150 „	53·8	1500 „	37·0
175 „	50·8	1800 „	37·0
200 „	48·0	2000 „	36·0
225 „	45·0	2200 „	33·3
250 „	42·5	2400 „	32·6
275 „	41·5	2500 „	32·6
300 „	40·6	2600 „	32·6
400 „	39·4	2700 „	32·6
500 „	38·6	Bottom,	32·6

Density at 60° F. at surface, 1·02603; bottom, 1·02600.

Depth, 2800 fathoms; deposit, Blue Mud, containing 4·04 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 8 A.M. got up steam, and at 8.30 A.M. shortened and furled sails. At 9 A.M. put trawl over and veered 2600 fathoms. At 10.30 A.M. sounded in 2800 fathoms. Took serial temperatures down to the bottom. The carbonic acid was determined in the bottom (?) water, and amounted to 51·7 milligrammes per litre. At 1.20 P.M. trawl-rope carried away, probably owing to friction against ship's side, as the rope parted close to the ship, and the trawl and over 3000 fathoms of rope were lost. At 5 P.M. completed observations and made sail. Albatrosses, mutton birds, black night hawks, and *Thalassidroma* were seen. STATION 324.

Tristan da Cunha distant at noon, 1740 miles. Made good 121 miles. Amount of current 30 miles, direction S. 56° E.

Surface Organisms.—The following species are recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

COPEPODA (Brady, Zool. pt. 23).

Calanus valgus, n.sp.
,, *tonsus*, n.sp.
Acartia denticornis, n.sp.
Pontella detruncata (Dana).
Saphirina inæqualis, Dana.

TUNICATA (Herdman, Zool. pt. 76).

Salpa democratica - mucronata, Forskål.

FISHES (Günther, Zool. pt. 78).

Ovum of a Scombresocid.

In addition, the following are recorded in the note-books from the tow-nets at the surface and down to 60 fathoms :—Diatoms, Coccospheres, and Rhabdoliths entangled in the sarcode of the Foraminifera, *Globigerina*, *Orbulina*, *Hastigerina*, Acanthometræ and compound Radiolaria, two forms of Medusæ, many Siphonophoræ, *Sagitta*, *Tomopteris*, Hyperids, *Squilla* larvæ, Mysids, *Euphausia* and larvæ, *Sergestes* larvæ, young of *Ianthina* and other Gasteropods, and other small shells, *Atlanta* and other Heteropods, *Styliola*, *Limacina*, and other Pteropods (one form with eggs in sac-like masses, in some of which the shell was partly, and in others almost completely, developed), several small forms of *Salpæ*, three forms of *Appendicularia*, and young fishes. A large shark was seen at the stern of the ship.

Station 325 (Sounding 475), Rio de la Plata to Tristan da Cunha (see Chart 16 and Diagram 6). STATION 325.

March 2, 1876 ; lat. 36° 44′ S., long. 46° 16′ W.
Temperature of air at noon, 74°·8 ; mean for the day, 71°·4.

Station 325.

Temperature of water :—

Surface,	70°·8	600 fathoms,	37°·8
25 fathoms,	69·8	700 „	37·2
50 „	68·3	800 „	37·2
75 „	65·3	900 „	37·2
100 „	62·2	1000 „	37·2
125 „	59·7	1100 „	37·2
150 „	58·8	1200 „	37·2
175 „	57·5	1300 „	37·2
200 „	56·1	1400 „	37·2
225 „	54·3	1500 „	37·2
250 „	51·2	2200 „	34·0
275 „	48·3	2300 „	33·2
300 „	45·0	2400 „	32·8
400 „	40·4	Bottom,	32·7
500 „	38·8		

Density at 60° F. :—

Surface,	1·02675	300 fathoms,	1·02675
25 fathoms,	1·02674	400 „	1·02583
50 „	1·02689	800 „	1·02535
100 „	1·02667	Bottom,	1·02583
200 „	1·02634		

Depth, 2650 fathoms; deposit, Blue Mud, containing no carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. shortened and furled sails, and proceeded under steam. At 5.30 A.M. sounded in 2650 fathoms. Put trawl over and veered 3200 fathoms. Obtained serial temperatures down to the bottom. The carbonic acid was determined in the bottom water, and amounted to 50·2 milligrammes per litre. Shortly after noon a shark over ten feet in length was caught. At 1 P.M. commenced heaving in trawl, which came up at 4 P.M. containing many specimens. Made sail. Many black night hawks (*Procellaria æquinoctialis*) were observed flying about the ship till quite dark.

Tristan da Cunha distant at noon, 1629 miles. Made good 76 miles. Amount of current 18 miles, direction S. 27° E.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Hexactinellida (Schulze, Zool. pt. 53).

Holascus stellatus, n.g., n.sp. Two specimens; obtained at no other locality.

Station 325.

Corals (Moseley, Zool. pt. 7).

Bathyactis symmetrica (Pourtalès). Fourteen specimens; for distribution see Station 24.

Siphonophoræ (Haeckel, Zool. pt. 77).

Anthemodes articulata, n.sp. Obtained at no other locality.

Asteroidea (Sladen, Zool. pt. 51).

Pontaster pristinus, n.g., n.sp. One specimen; obtained at no other locality.

Dytaster nobilis, n.g., n.sp. Several specimens; obtained at no other locality.

Hymenaster pergamentaceus, n.sp. Obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophiocten umbraticum, n.sp. Several specimens; obtained at no other locality.

Amphiura dalea, n.sp. Several specimens; obtained at no other locality.

Holothurioidea (Théel, Zool. pt. 13).

Scotoplanes papillosa, n.g., n.sp. One specimen; obtained at no other locality.

Oneirophanta mutabilis, n.g., n.sp. Several specimens; obtained also at Stations 146, 157, 160, 241, 244, 281, and 299.

Annelida (M'Intosh, Zool. pt. 34).

Myriochele heeri, Malmgren, var. One specimen; the species obtained also at Stations 20 and 47 (var.).

Amphicteis sarsi, n.sp. One specimen; obtained at no other locality.

Eupista grubei, n.g., n.sp. Several specimens; obtained at no other locality. The only other species of the genus (*Eupista darwini*) was taken at Stations 63 and 298.

Macrura (Spence Bate, Zool. pt. 52).

Hemipenæus speciosus, n.g., n.sp. Two specimens; obtained at no other locality.

Pycnogonida (Hoek, Zool. pt. 10).

Colossendeis brevipes, n.sp. Two specimens; obtained at no other locality.

Lamellibranchiata (Smith, Zool. pt. 35).

Silenia sarsii, n.g., n.sp. One specimen; obtained also at Station 157. Only species of the genus.

Gasteropoda (Watson, Zool. pt. 42).

Stylifer brychius, n.sp. Several specimens; obtained at no other locality.

Station 325.

Polyzoa (Busk, Zool. pt. 30).

Cellularia crateriformis, n.sp. Obtained also at Station 323.
Kinetoskias cyathus (Wyville Thomson), n.sp. Obtained also at Station VI.
Farciminaria magna, n.sp. Obtained also at Stations 153 and 323 (var. *armata*).

Fishes (Günther, Zool. pt. 57).

Macrurus filicauda, n.sp. Three specimens; obtained also at Stations 146, 157, 158, 299, and 323.
Bathypterois longipes, n.g., n.sp. Two specimens; obtained at no other locality.

In addition to the foregoing, the following are recorded in the Station-book:—Several Actinians of three species, many Holothurians of four or five forms (only two species noted above), two Schizopods, and *Discina*.

Excluding Protozoa, over 100 specimens of invertebrates and fishes were obtained at this Station, belonging to about 29 species, of which 19 are new to science, including representatives of 9 new genera; 13 of the new species were not obtained elsewhere.

Organisms from the Deposit.

Radiolaria (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

Staurosphæra petri, Haeckel.
Acanthosphæra florida, Haeckel.
Tholonium bicubicum, Haeckel.
Lampromitra pyramidalis, Haeckel.
Auloceros cervinus, Haeckel.
Challengeria macleari, Murray.
Gazelletta pinnata, Haeckel.
Circospathis furcata, Haeckel.
Haeckeliana lamarckiana, Haeckel.
Tuscarora porcellana, Murray.
Conchopsis pilidium, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface and deep tow-nets at this Station:—

Radiolaria (Haeckel, Zool. pt. 40).

Thalassanthium hexactinium, Haeckel.
Cenosphæra papillata, Haeckel.
Carposphæra prunulum, Haeckel.
Plegmosphæra exodictyon, Haeckel.
Solenosphæra amalthea, Haeckel.
Hexastylus chalonis, Haeckel.
Acanthosphæra insignis, Haeckel.
Heliosphæra electra, Haeckel.
Staphaerozoum umbelliferum, Haeckel.
Leptosphæra ciliata, Haeckel.
Cenosphæra dodecacanthus, Haeckel.
Spongiomma asteroides, Haeckel.
Ellipsoxiphus fragilis, Haeckel.
Lithatractus conifer, Haeckel.
Spongellipsis setosa, Haeckel.
Spongocore velata, Haeckel.
Spongoliva opuntina, Haeckel.
Distriactis palmantha, Haeckel.
Astrosestrum floscula, Haeckel.
Rhopalastrum malleus, Haeckel.
Chitonastrum jugatum, Haeckel.
Dicranastrum cornutum, Haeckel.

Pylolena armata, Haeckel.
Spongotrochus parma, Haeckel.
Dictyocoryne echinata, Haeckel.
Stauracantha quadrifurca, Haeckel.
Quadrilonche telostaura, Haeckel.
Amphibelone aciculata, Haeckel.
Hystrichaspis sulcata, Haeckel.
Acontaspis lanceolata, Haeckel.
Phatnaspis coscinoides, Haeckel.
Carpocanistrum novenum, Haeckel.
Sethophormis floscula, Haeckel.
Sethoconus orthoceras, Haeckel.
Clathrocyclas latonæ, Haeckel.
Aulographis bovicornis, Haeckel.
„ *cruciata*, Haeckel.
Sagena triangula, Haeckel.
Challengeria thomsoni, Murray.

OSTRACODA (Brady, Zool. pt. 3).

Halocypris atlantica, Lubbock.
„ *imbricata*, n.sp.

COPEPODA (Brady, Zool. pt. 23).

Calanus tonsus, n.sp.
Rhincalanus gigas, n.sp.
Pleuromma abdominale (Lubbock).
Heterochæta spinifrons, Claus.
Leuckartia flavicornis, Claus.
Undina darwinii, Lubbock.
Euchæta prestandreæ, Philippi.
„ (?) *philippii*, n.sp.
„ *australis*, n.sp.
„ *gigas*, n.sp.
„ *barbata*, n.sp.
Phyllopus bidentatus, n.g., n.sp.
Setella gracilis, Dana.
Corycæus pellucidus, Dana.
„ *obtusus*, Dana.
Oncæa obtusa (Dana).
Nogagus lunatus, Steenstrup and Lütken, (parasitic on *Carcharias*).

TUNICATA (Herdman, Zool. pt. 76).

Salpa democratica - mucronata, Forskål.

FISHES (Günther, Zool. pt. 78).

Carcharias glaucus, Linné.

In addition, the following are recorded in the note-books:—Oscillatoriaceæ, *Peridinium tripos*, Diatoms, *Globigerina*, *Hastigerina*, Medusæ, Siphonophoræ, *Beroë*, *Sagitta*, *Alciopa*, Annelid larvæ, Hyperids, Mysids and larvæ, larvæ of *Sergestes* and *Lucifer*, small crab, larval Gasteropods, *Atlanta* and other Heteropods, *Cavolinia*, *Styliola*, *Limacina*, and other Pteropods (with eggs as at the previous Station), *Appendicularia*, Scopelid, two inches in length, with brilliant scales, flying fish half an inch in length, and other small fishes. Mr. Murray was away in a boat, and noticed on the surface only very small *Velellæ;* with the water-glass many small things could be seen, but on the whole the water was very clear and blue. The tow-nets at the weights and trawl contained many surface and deep-sea organisms, including Challengeridæ and other Radiolaria, *Sagitta*, *Cypridina*, red Copepods, and a large red Schizopod.

Station 326.

Station 326 (Sounding 476), Rio de la Plata to Tristan da Cunha (see Chart 16 and Diagram 6).

March 3, 1876 ; lat. 37° 3′ S., long. 44° 17′ W.

Temperature of air at noon, 67°·8 ; mean for the day, 68°·0.

Temperature of water :—

Surface,	67°·8	300 fathoms,	39°·1
25 fathoms,	63·7	400 „	37·8
50 „	59·0	500 „	37·1
75 „	55·8	600 „	37·0
100 „	53·3	700 „	37·0
125 „	50·4	800 „	37·0
150 „	46·1	900 „	37·0
175 „	43·5	1000 „	37·0
200 „	42·0	2125 „	37·0
225 „	41·2	2325 „	36·2
250 „	40·2	2525 „	33·0
275 „	39·7	Bottom,	32·6

Density at 60° F. at surface, 1·02491 ; bottom, 1·02581.

Depth, 2775 fathoms ; deposit, Blue Mud, containing 3·11 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 3 P.M. shortened and furled sails, and proceeded under steam to sound. At 4 P.M. sounded in 2775 fathoms. Obtained serial temperatures. The carbonic acid was determined in the surface water, and amounted to 34·0 milligrammes per litre. At 7 P.M. completed observations and made sail. *Diomedea exulans* and two kinds of petrels were seen from the ship.

Tristan da Cunha distant at noon, 1551 miles. Made good 78 miles.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Siphonophoræ (Haeckel, Zool. pt. 77).

Vogtia köllikeri, n.sp.

Copepoda (Brady, Zool. pt. 23).

Calanus valgus, n.sp.
Candace pachydactyla, Dana.
Temora dubia (Lubbock).
Centropages violaceus (Claus).
Pontellopsis villosa, n.g., n.sp.
Corycæus varius, Dana.
Oncæa obtusa (Dana).
Saphirina inæqualis, Dana.

Amphipoda (Stebbing, Zool. pt. 67).

Phronimella sp. (?).

Schizopoda (Sars, Zool. pt. 37).

Thysanoëssa gregaria, n.sp.
Nematoscelis rostrata, n.g., n.sp.
Siriella thompsoni (M.-Edwards).

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *acicula* (Rang).

In addition, the following are recorded in the note-books from the tow-nets at the surface and down to 50 fathoms :—*Peridinium tripos*, *Globigerina*, Acanthometræ and compound Radiolaria, *Carchesium*, Medusæ, *Beroë*, Echinoderm larvæ, *Sagitta*, *Alciopa*, Aphroditacean larvæ, Planarians, *Cypridina*, Hyperids, Zoëæ of Decapods, *Archizoëa*, *Atlanta*, *Firoloida*, *Limacina* and other Pteropods, *Cymbulia* larvæ, *Membranipora* larvæ, *Appendicularia*, and many specimens of a stage of *Doliolum*, which gave the tow-net a slight reddish appearance. The tow-net sent down to 50 fathoms contained a number of *Globigerinæ*, which were not noticed in the surface hauls, and several organisms apparently indicating the presence of shore or river water, such as Echinoderm larvæ, *Membranipora* larvæ, Planarians, *Carchesium*, and Aphroditacean larvæ. STATION 326.

Station 327 (Sounding 477), Rio de la Plata to Tristan da Cunha (see Chart 16 and Diagram 6). STATION 327.

March 4, 1876 ; lat. 36° 48′ S., long. 42° 45′ W.

Temperature of air at noon, 68°·8 ; mean for the day, 68°·4.

Temperature of water :—

	°		°
Surface, ...	70·2	300 fathoms, . . .	46·0
25 fathoms, . . .	68·0	400 „ . . .	40·4
50 „ . . .	66·8	500 „ . . .	38·4
75 „ . . .	65·6	600 „ . . .	37·8
100 „ . . .	64·0	700 „ . . .	37·6
125 „ . . .	62·0	800 „ . . .	37·4
150 „ . . .	59·7	900 „ . . .	37·2
175 „ . . .	57·5	1000 „ . . .	37·0
200 „ . . .	55·0	2225 „ . . .	34·0
225 „ . . .	52·5	2425 „ . . .	33·5
250 „ . . .	50·3	2625 „ . . .	33·1
275 „ . . .	48·2	Bottom, . . .	32·8

Density at 60° F. at surface, 1·02633 ; bottom, 1·02614.

Depth, 2900 fathoms; deposit, Red Clay, containing no carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 1.30 P.M. shortened and furled sails, and proceeded under steam, and at 2.30 P.M. sounded in 2900 fathoms. Over a litre of the deposit was obtained in the sounding-tube, the upper layers having a dark slate colour, while the lower layers had a tinge of red and were more compact. Obtained serial temperatures. At 5 P.M. completed observations, and at 5.20 P.M. made sail. Albatrosses, black petrels, and another petrel were seen.

Tristan da Cunha distant at noon, 1462 miles. Made good 89 miles. Amount of current for the past two days 26 miles, direction S. 70° E.

Station 327. Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Siphonophoræ (Haeckel, Zool. pt. 77).

Porpema medusa, n.sp.
Diphyopsis compressa, n.g., n.sp.

Copepoda (Brady, Zool. pt. 23).

Calanus valgus, n.sp.
Candace pachydactyla, Dana.
Centropages violaceus (Claus).
Pontellopsis villosa, n.g., n.sp.
Oncæa obtusa (Dana).

Amphipoda (Stebbing, Zool. pt. 67).

Phronimella sp. (?).

Schizopoda (Sars, Zool. pt. 37).

Thysanoëssa gregaria, n.sp.
Siriella thompsoni (M.-Edwards).

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *acicula* (Rang).
Cavolinia inflexa (Lesueur).

Tunicata (Herdman, Zool. pt. 76).

Salpa democratica - mucronata, Forskål.

In addition, the following are recorded in the note-books : — Oscillatoriaceæ (*Trichodesmium*), *Globigerina*, *Orbulina*, *Hastigerina*, Acanthometræ and compound Radiolaria, Medusæ, small *Velellæ*, Ctenophoræ, *Sagitta*, *Alciopa*, Mysids, small *Ianthinæ* and other small shells, Pteropods and larvæ, including a naked form and larvæ of *Cymbulia* (?), *Appendicularia*, large *Salpæ* with leathery tests having Coccospheres and Rhabdospheres in the stomachs, and many small fishes, including a Scopelid, an inch in length, with brilliant scales.

Station 328.

Station 328 (Sounding 478), Rio de la Plata to Tristan da Cunha (see Chart 16 and Diagram 6).

March 6, 1876 ; lat. 37° 38′ S., long. 39° 36′ W.
Temperature of air at noon, 65°·8 ; mean for the day, 62°·9.
Temperature of water at surface, 68°·0 ; bottom, 32°·9.
Density at 60° F. at surface, 1·02571.
Depth, 2900 fathoms ; deposit, Red Clay, containing no carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 11.10 A.M. shortened and furled sails, and proceeded under steam to sound. At 1 P.M. sounded in 2900 fathoms. The sounding-tube brought up over a litre of the clay, of which the upper layers were slightly darker than the lower. On account of the heavy sea no temperature observations were attempted. At 2 P.M. completed sounding

and made sail. *Diomedea exulans, Procellaria æquinoctialis,* and Thalassidromas were seen. STATION 328.

Tristan da Cunha distant at noon, 1300 miles. Made good 114 miles. No current.

Surface Organisms.—The following species is recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

COPEPODA (Brady, Zool. pt. 23).

Pontella magna (Lubbock).

The tow-net yielded only one or two small fishes, a specimen of *Velella,* a few Copepods, and some larval shells.

Station 329 (Sounding 479), Rio de la Plata to Tristan da Cunha (see Chart 16 and Diagram 6). STATION 329.

March 7, 1876 ; lat. 37° 31′ S., long. 36° 7′ W.
Temperature of air at noon, 67°·8 ; mean for the day, 66°·0.
Temperature of water :—

Surface,	64·5	400 fathoms,	38·9
25 fathoms,	63·7	500 „	38·0
50 „	57·0	600 „	37·4
75 „	55·8	700 „	37·0
100 „	54·5	800 „	37·0
125 „	53·2	900 „	37·0
150 „	51·3	1000 „	37·0
175 „	48·0	1800 „	37·0
200 „	45·0	2000 „	36·0
225 „	43·0	2200 „	32·6
250 „	41·5	2400 „	32·5
275 „	40·7	Bottom,	32·3
300 „	40·2		

Density at 60° F. :—

Surface,	1·02606	2000 fathoms,	1·02584
200 fathoms,	1·02569	Bottom,	1·02576
400 „	1·02535		

Depth, 2675 fathoms ; deposit, Red Clay, containing 0·70 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 10 A.M. got up steam. At 11 A.M. shortened and furled sails, and proceeded under steam to sound. At noon sounded in 2675 fathoms. Took serial temperatures, and obtained specimens of water. At 5.20 P.M. completed observations and made sail. *Diomedea exulans, Diomedea fuliginosa* (?), molly mauks (*Diomedea melanophrys* ?),

Station 329. stinkers (*Procellaria gigantea*), black night hawks (*Procellaria æquinoctialis*), mutton birds, prions (*Prion turtur*), and Thalassidromas were seen.

Tristan da Cunha distant at noon, 1142 miles. Made good 165 miles. Amount of current 9 miles, direction N. 15° W.

Organisms from Surface-Nets. Surface Organisms.—The following species are recorded from the surface at this Station :—

Copepoda (Brady, Zool. pt. 23).
Centropages violaceus (Claus).

Fishes (Günther, Zool. pt. 78).
Scopelus coccoi (Cocco).
Scombresox saurus, (young).

In addition, the note-books record :—*Sagitta*, Hyperids, and *Euphausia*.

Station 330. **Station 330** (Sounding 480), Rio de la Plata to Tristan da Cunha (see Chart 16 and Diagram 6).

March 8, 1876 ; lat. 37° 45′ S., long. 33° 0′ W.
Temperature of air at noon, 67°·3 ; mean for the day, 65°·7.
Temperature of water :—

Surface,	64·2	400 fathoms,	40·7
25 fathoms,	63·0	500 „	38·7
50 „	59·0	600 „	37·8
75 „	57·0	700 „	37·5
100 „	56·2	800 „	37·5
125 „	55·6	900 „	37·5
150 „	55·4	1000 „	37·5
175 „	55·2	1580 „	37·5
200 „	53·0	1780 „	36·5
225 „	50·5	1980 „	35·3
250 „	48·0	2180 „	34·2
275 „	46·0	Bottom,	32·7
300 „	44·7		

Density at 60° F. at surface, 1·02620 ; bottom, 1·02608.
Depth, 2440 fathoms ; deposit, Red Clay, containing 10·36 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 12.30 P.M. got up steam. At 1.15 P.M. shortened and furled sails, and proceeded under steam. At 2 P.M. sounded in 2440 fathoms. The sounding-tube had sunk about fifteen inches into the bottom, and brought up over two litres of clay, of which the lower layers had a blue rather than a red tinge and contained very little, if any, carbonate of lime. A worm-tube had a deposit of manganese in the inside. Took serial temperatures. At 4.15 P.M. completed observations and made sail. Birds as noted at the previous Station were seen.

Distance at noon from Tristan da Cunha, 1000 miles. Made good 143 miles. Amount of current 23 miles, direction S. 70° E. STATION 330.

Surface Organisms.—The following species are recorded from the surface and deep tow-nets at this Station :— ORGANISMS FROM SURFACE-NETS

RADIOLARIA (Haeckel, Zool. pt. 40).

Carposphæra micrococcus, Haeckel.
Thecosphæra diplococcus, Haeckel.
Amphisphæra cronos, Haeckel.
Heliosestrum æginetа, Haeckel.
Amphymenium fusiforme, Haeckel.
Histiastrum velatum, Haeckel.
Tetrapyle cruciata, Haeckel.
Stauracantha quadrifurca, Haeckel.
Ceriaspis lacunosa, Haeckel.
Lychnaspis serrata, Haeckel.
Lychnodictyum sethopodium, Haeckel.
Aulographis cruciata, Haeckel.
Challengeria thomsoni, Murray.
Pharyngella gastræa, Haeckel.

OSTRACODA (Brady, Zool. pt. 3).

Halocypris brevirostris, Dana.

COPEPODA (Brady, Zool. pt. 23).

Pleuromma abdominale (Lubbock).
Heterochæta spinifrons, Claus.

AMPHIPODA (Stebbing, Zool. pt. 67).

Calamorhynchus rigidus, n.sp.

In addition, the following are recorded in the note-books :—*Hastigerina*, Medusæ, *Distomum*, *Sagitta*, Phronimids, *Oxycephalus*, Hyperids, large *Euphausiæ* (?) with Coccospheres and Rhabdoliths in their stomachs, small shells (Gasteropods ?), Pteropods, and *Salpa*.

Station 331 (Sounding 481), Rio de la Plata to Tristan da Cunha (see Chart 16 and Diagram 6). STATION 331.

March 9, 1876 ; lat. 37° 47′ S., long. 30° 20′ W.
Temperature of air at noon, 68°·8 ; mean for the day, 66°·8.
Temperature of water :—

Surface,	64·5	300 fathoms,	43·3
25 fathoms,	62·0	400 „	39·6
50 „	58·0	500 „	37·5
75 „	56·0	600 „	37·0
100 „	54·9	700 „	37·0
125 „	54·1	800 „	37·0
150 „	54·0	900 „	37·0
175 „	53·7	1000 „	37·0
200 „	51·0	1200 „	37·0
225 „	48·5	1400 „	37·0
250 „	46·5	Bottom,	35·4
275 „	45·0		

STATION 331.

Density at 60° F. :—

Surface,	1·02620	300 fathoms,	1·02545
25 fathoms,	1·02606	400 „	1·02540
50 „	1·02618	800 „	1·02566
100 „	1·02616	Bottom,	1·02588
200 „	1·02589		

Depth, 1715 fathoms; deposit, Globigerina Ooze, containing 78·38 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 11.15 A.M. shortened and furled sails, and proceeded under steam to sound and trawl. At 12.30 P.M. sounded in 1715 fathoms. The sounding-tube had sunk a foot into the bottom, and brought up over a litre of the ooze; the lower layers were more compact than the upper. Put trawl over and veered 2200 fathoms. Obtained serial temperatures. The carbonic acid was determined in water from 400 fathoms, and amounted to 43·6 milligrammes per litre. At 4.15 P.M. commenced heaving in trawl, which came up at 5.45 P.M. bottom up, but with a shrimp entangled in the meshes of the net. It appears that the small lead at the end of the trawl had become hitched round the beam, the net being thus doubled up, and the shrimp was found in the fold thus formed. In one of the tow-nets at the trawl were a great many dead empty shells of Foraminifera which evidently came from the bottom. Made sail. Birds as noted at Station 229 were seen.

Tristan da Cunha distant at noon, 865 miles. Made good 135 miles. Amount of current 27 miles, direction S. 52° W.

ANIMALS FROM TRAWL.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

DEEP-SEA KERATOSA (Haeckel, Zool. pt. 82).

Psammina plakina, n.g., n.sp. Two specimens; obtained at no other locality.

MACRURA (Spence Bate, Zool. pt. 52).

Glyphocrangon rimapes, n.sp. One specimen; obtained also at Stations 237 and 300.

The Station-book records also a tentacle of a Cœlenterate.

ORGANISMS FROM SURFACE NETS.

Surface Organisms.—The following species are recorded from the surface and deep tow-nets at this Station :—

AMPHIPODA (Stebbing, Zool. pt. 67).

Cyllopus hookeri, n.sp.

SCHIZOPODA (Sars, Zool. pt. 37).

Nematoscelis megalops, n.g., n.sp.

TUNICATA (Herdman, Zool. pt. 76).

Salpa cordiformis-zonaria, Quoy and Gaimard—Pallas.

„ *runcinata - fusiformis*, Chamisso—Cuvier.

In addition, the following are recorded in the note-books :—Challengeridæ and other Radiolaria, Ctenophoræ, *Distomum* (probably from the *Euphausiæ*), *Cypridina*, Copepods, Hyperids and other Amphipods, *Euphausia*, and Pteropods. The stomachs of the *Salpæ* were filled with Coccospheres, Rhabdospheres, small specimens of *Peridinium*, many small yellow cells, &c. In the tow-net attached to the trawl, in addition to deep-sea Radiolaria, red Copepods, and Cypridinas, there were large numbers of the dead shells of pelagic Foraminifera, evidently from the bottom. STATION 331.

Station 332 (Sounding 482), Rio de la Plata to Tristan da Cunha (see Chart 16 and Diagram 6). STATION 332.

March 10, 1876; lat. 37° 29′ S., long. 27° 31′ W.
Temperature of air at noon, 62°·3; mean for the day, 62°·3.
Temperature of water :—

Surface,	64·0	275 fathoms,	45·5
25 fathoms,	58·8	300 ,,	43·8
50 ,,	57·0	400 ,,	38·9
75 ,,	56·2	500 ,,	37·5
100 ,,	55·5	600 ,,	37·3
125 ,,	55·0	700 ,,	37·3
150 ,,	54·7	800 ,,	37·3
175 ,,	54·0	900 ,,	37·3
200 ,,	52·0	1000 ,,	37·3
225 ,,	50·0	Bottom,	34·0
250 ,,	47·5		

Density at 60° F. :—

Surface,	1·02604	1400 fathoms,	1·02591
800 fathoms,	1·02552	Bottom,	1·02580

Depth, 2200 fathoms; deposit, Globigerina Ooze, containing 65·67 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 8.45 A.M. shortened and furled sails. At 9 A.M. proceeded under steam to sound and trawl. At 10 A.M. sounded in 2200 fathoms. Put trawl over and veered 2700 fathoms. This Station is about 220 miles distant from Station 132 on the track of 1873. Obtained serial temperatures down to 1000 fathoms. The carbonic acid was determined in water from 800 fathoms and the bottom, and amounted respectively to 43·6 and 46·6 milligrammes per litre. At 3.30 P.M. commenced heaving in trawl, which came up at 4.55 P.M. with only a few specimens, having evidently been wrong side up; one of

Station 332. the tow-nets at the trawl was quite full of deposit. At 5 P.M. made sail. The usual birds, as noted at Station 229, were seen.

Tristan da Cunha distant at noon, 730 miles. Made good 136 miles. Amount of current 8 miles, direction S.

Animals from Trawl. The following species are recorded in the Zoological Reports from the trawl at this Station :—

Monaxonida (Ridley and Dendy, Zool. pt. 59).

Cladorhiza inversa, n.sp. One specimen ; obtained at no other locality.

Corals (Moseley, Zool. pt. 7).

Bathyactis symmetrica (Pourtalès). For distribution see Station 24.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophiomusium armigerum, n.sp. Obtained also at Stations 83, 106, and 299 (?).

Polyzoa (Busk, Zool. pt. 30).

Bicellaria navicularis, n.sp. Obtained also at Station 122.
Bugula margaritifera, n.sp. Obtained also at Station 323.

In addition to the foregoing, the Station-book records fragments of siliceous Sponge and a Schizopod.

Excluding Protozoa, 7 specimens of invertebrates were obtained at this Station, belonging to 7 species, of which 4 are new to science; 1 of the new species was not obtained elsewhere.

Organisms from the Deposit. The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :—

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 84 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina bulloides, d'Orbigny.
„ *depressa*, d'Orbigny.
Spiroloculina tenuis (Czjzek).
Miliolina venusta (Karrer).
Psammosphæra fusca, Schulze.
Hyperammina elongata, Brady.
„ *ramosa*, Brady.
Reophax adunca, Brady.
„ *dentaliniformis*, Brady.
„ *difflugiformis*, Brady.
„ *scorpiurus*, Montfort.
Haplophragmium agglutinans (d'Orbigny).
Haplophragmium anceps, Brady.
„ *globigeriniforme* (Parker and Jones).
„ *latidorsatum* (Bornemann).
Thurammina globulifera, Brady.
„ *oviculu*, Brady.
„ *papillata*, Brady.
Ammodiscus charoides (Jones and Parker).
„ *incertus* (d'Orbigny).
Trochammina galeata, Brady.
„ *trullissata*, Brady.
Textularia concava (Karrer).

Verneuilina pygmæa (Egger).
Clavulina communis, d'Orbigny.
Bulimina ovata, d'Orbigny.
„ *pyrula*, d'Orbigny.
Virgulina schreibersiana, Czjzek.
„ *subdepressa*, Brady.
Bolivina punctata, d'Orbigny.
Pleurostomella subnodosa, Reuss.
Lagena acuta (Reuss).
„ *auriculata*, Brady.
„ *fieldeniana*, Brady.
„ *globosa* (Montagu).
„ *gracillima* (Seguenza).
„ *lævigata* (Reuss).
„ *lævis* (Montagu).
„ *lagenoides* (Williamson).
„ *longispina*, Brady.
„ *marginata* (Walker and Boys).
„ *orbignyana* (Seguenza).
„ *quadralata*, Brady.
„ *semimarginata*, Reuss.
„ *seminuda*, Brady.
„ *striatopunctata*, Parker and Jones.
„ *sulcata* (Walker and Jacob).
„ *truncata*, Brady.
„ *unguiculata*, Brady.

Nodosaria calamorpha, Reuss. STATION 332.
„ *communis*, d'Orbigny.
„ *mucronata*, Neugeboren.
Cristellaria rotulata (Lamarck).
Polymorphina angusta, Egger.
Uvigerina asperula, Czjzek.
„ *pygmæa*, d'Orbigny.
× *Globigerina bulloides*, d'Orbigny.
× „ *inflata*, d'Orbigny.
× *Orbulina universa*, d'Orbigny.
Pullenia quinqueloba, Reuss.
„ *sphæroides* (d'Orbigny).
Sphæroidina bulloides, d'Orbigny.
Truncatulina lobatula (Walker and Jacob).
„ *ungeriana* (d'Orbigny).
„ *wuellerstorfi* (Schwager).
Anomalina ariminensis (d'Orbigny).
× *Pulvinulina canariensis* (d'Orbigny).
„ *exigua*, Brady.
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
Rotalia orbicularis, d'Orbigny.
„ *soldanii*, d'Orbigny.
Nonionina depressula (Walker and Jacob).
„ *pompilioides* (Fichtel and Moll).
„ *umbilicatula* (Montagu).

RADIOLARIA (Haeckel, Zool. pt. 40).

Cenosphæra antiqua, Haeckel.
Siphonosphæra infundibulum, Haeckel.
Saturnalis circularis, Haeckel.
Amphisphæra jupiter, Haeckel.
Staurosphæra thomæ, Haeckel.
Hexalonche serrata, Haeckel.
Hexaloncharium octahedrum, Haeckel.
Hexacontium lævigatum, Haeckel.
„ *clavigerum*, Haeckel.
Acanthosphæra angulata, Haeckel.
Haliomma regulare, Haeckel.
Echinomma aculeatum, Haeckel.
Cenellipsis infundibulum, Haeckel.
Prunulum cerasum, Haeckel.
Druppatractus pisciculus, Haeckel.
Xiphatractus euplractus, Haeckel.
Artiscus elegans, Haeckel.
Cannartus bitubulus, Haeckel.
Cannartidium bicinctum, Haeckel.
Trochodiscus odontotrochus, Haeckel.
Phacodiscus echiniscus, Haeckel.
Sethostylus serratus, Haeckel.

Astrosestrum acraspedum, Haeckel.
Coccodiscus goethei, Haeckel.
Amphicyclia pachydiscus, Haeckel.
Astrocyclia rotula, Haeckel.
Trigonactura lanceolata, Haeckel.
Hymenactura trigona, Haeckel.
Porodiscus radiatus, Haeckel.
Stylodictya solmaris, Haeckel.
Euchitonia carcinus, Haeckel.
Pentophiastrum forcipatum, Haeckel.
Triopyle spinigera, Haeckel.
Larnacoma hexagonium, Haeckel.
Dizonium stauracanthum, Haeckel.
Octopyle euryzona, Haeckel.
Tetrapylonium quadrangulare, Haeckel.
Amphitholus octacanthus, Haeckel.
„ *polyacanthus*, Haeckel.
Tholocubus tessellatus, Haeckel.
Spironium octonium, Haeckel.
Streblonia uvigerina, Haeckel.
Spongophortis radiosa, Haeckel.
Sphærocapsa dentata, Haeckel.

Station 332.

Tessaraspis quadrata, Haeckel.
Archicircus sexangularis, Haeckel.
Cortina furcata, Haeckel.
Stephaniscus medusinus, Haeckel.
Zygosteptanus violina, Haeckel.
Acrocubus tetrapodius, Haeckel.
Dystympanium medusa, Haeckel.
Eutympanium coronarium, Haeckel.
Tripospyris diomma, Haeckel.
Triceraspyris coratturrhiza, Haeckel.
Dendraspyris potyrrhiza, Haeckel.
Tessarospyris clathrobursa, Haeckel.
Taurospyris cerrina, Haeckel.
Ceratospyris preyeri, Haeckel.
Gorgospyris polypus, Haeckel.
Sphærospyris quadriforis, Haeckel.
Botryocyrtis cerebellum, Haeckel.
Tripilidium ovatum, Haeckel.
Tridictyopus ratillum, Haeckel.
Cladoscenium pectinatum, Haeckel.
Haliphormis lagena, Haeckel.
Cornutella sethoconus, Haeckel.
Dictyophimus lasanum, Haeckel.
Lithomelissa macroceras, Haeckel.
Lychnocanium ovatum, Haeckel.
Peromelissa catva, Haeckel.
Sethophormis enneactis, Haeckel.
Sethamphora enneapleura, Haeckel.
Pterotpyramis heteromma, Haeckel.
Anthocyrtis enneaphyllum, Haeckel.
Pterocanium gravidum, Haeckel.
Podocyrtis cristata, Haeckel.
Lithornithium ciconia, Haeckel.
Theopera prismatica, Haeckel.
Lithochytris galeata, Haeckel.
Calocyclas minervæ, Haeckel.
Lophocorys quadricornis, Haeckel.
Theocapsa wottonis, Haeckel.
,, *cuvieri*, Haeckel.
Eucyrtidium doliolum, Haeckel.
Lithocampe nereidum, Haeckel.
Catinulus catillum, Haeckel.
Aulodendron atlanticum, Haeckel.
Orosphæra ramigera, Haeckel.
Aulosphæra diodon, Haeckel.
Cœlacantha mammillata, Haeckel.
Lithogromia lenticula, Haeckel.
Challengeria campbelli, Murray.
,, *macleari*, Murray.
,, *trigona*, Haeckel.
Challengeron tizardi, Murray.
Porcupinia cordiformis, Haeckel.
Medusetta minima, Haeckel.
Euphysetta amphicodon, Haeckel.
Castanella horstoni, Haeckel.
Castanissa pearceyi, Haeckel.
Castanopsis macleari, Haeckel.
Circospathis tetradeca, Haeckel.
Haeckeliana lamarckiana, Haeckel.
Concharium nucula, Haeckel.
Conchopsis pilidium, Haeckel.
Cœlodendrum cervicorne, Haeckel.
Cœloderas pentagona, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface and deep tow-nets in the vicinity of this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Sphærozoum arborescens, Haeckel.
Xiphostylus enberiza, Haeckel.
Stylosphæra dixyphos, Haeckel.
Arachnosphæra tenuissima, Haeckel.
Ellipsostylus columba, Haeckel.
Rhopalastrum clavatum, Haeckel.
Larnacosponga tetrapylifer, Haeckel.
Monozonium amphistylum, Haeckel.
Litholophus decastylus, Haeckel.
Astrolonche pinnata, Haeckel.
Xiphacantha staurophera, Haeckel.
Stauracantha murrayana, Haeckel.
Acanthostaurus conacanthus, Haeckel.
Zonaspis fragilis, Haeckel.
Phractopelta diporaspis, Haeckel.
Octopetta furcella, Haeckel.
Phatnaspis polypora, Haeckel.
Hexonaspis hexapleura, Haeckel.
Tetraplagia phænaxonia, Haeckel.
Theocorys apotlinis, Haeckel.
Aulographis cruciata, Haeckel.
Aulatractus ellipsoides, Haeckel.
Pharyngella gastræa, Haeckel.

Ostracoda (Brady, Zool. pt. 3).

Cythere dictyon, n.sp.
,, *dasyderma*, n.sp.

Copepoda (Brady, Zool. pt. 23).

Pontostratiotes abyssicola, n.g., n.sp.

Amphipoda (Stebbing, Zool. pt. 67).

Vibilia sp. (?).

Schizopoda (Sars, Zool. pt. 37).

Thysanoëssa gregaria, n.sp.

Nematoscelis megalops, n.g., n.sp. Station 332.
Stylocheiron elongatum, n.g., n.sp.

Pteropoda (Pelseneer, Zool. pts. 58 and 65).

Spongiobranchæa australis, d'Orbigny.
Clio (*Styliola*) *subula* (Quoy and Gaimard).
,, *pyramidata*, Linné.

Tunicata (Herdman, Zool. pt. 76).

Salpa runcinata - fusiformis, Chamisso—Cuvier.

The tow-nets at the surface and down to 150 or 200 fathoms yielded :—Ctenophoræ, *Tomopteris*, small Copepods, Amphipods, Isopods, many *Euphausiæ* (some with *Distomum* and *Bopyrus* parasitic), *Pleuropus* and *Diacria* [= *Cavolinia*] and other small Pteropods, many *Salpæ*, small Scopelids. Most of these animals appeared to feed on *Peridinium*, *Coccospheres*, and other minute organisms, for their stomachs were filled with them. The tow-net at the weights showed no signs of having touched the bottom, and contained several varieties of Challengeridæ, while one of the tow-nets at the trawl had very little deposit in it and brought up a specimen of *Sternoptyx*.

Station 333 (Sounding 483), Rio de la Plata to Tristan da Cunha (see Chart 16 and Diagram 6). Station 333.

March 13, 1876 ; lat. 35° 36′ S., long. 21° 12′ W.
Temperature of air at noon, 71°·3 ; mean for the day, 69°·4.
Temperature of water :—

	°		°
Surface, . . .	67·0	400 fathoms, . . .	39·9
25 fathoms, . . .	62·2	500 ,, . . .	38·4
50 ,, . . .	57·2	600 ,, . . .	37·6
75 ,, . . .	55·2	700 ,, . . .	37·3
100 ,, . . .	55·0	800 ,, . . .	37·3
125 ,, . . .	54·2	900 ,, . . .	37·3
150 ,, . . .	52·0	1000 ,, . . .	37·3
175 ,, . . .	49·3	1250 ,, . . .	37·3
200 ,, . . .	46·5	1450 ,, . . .	37·3
225 ,, . . .	45·0	1650 ,, . . .	37·3
250 ,, . . .	43·8	1850 ,, . . .	37·3
275 ,, . . .	42·7	Bottom, . . .	35·4
300 ,, . . .	42·0		

Station 333.

Density at 60° F. :—

Surface,	1·02612	300 fathoms,	1·02558
25 fathoms,	1·02612	400 „	1·02546
50 „	1·02620	800 „	1·02571
100 „	1·02620	Bottom,	1·02584
200 „	1·02581		

Depth, 2025 fathoms; deposit, Globigerina Ooze, containing 88·97 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 4.30 A.M. shortened and furled sails, and got up steam. At 5 A.M. proceeded under steam to sound and trawl. At 5.30 A.M. sounded in 2025 fathoms. The sounding-tube had sunk about a foot into the deposit, but contained only a small quantity of the ooze. Laid out trawl and veered 2600 fathoms. Took serial temperatures. The carbonic acid was determined in water from 100 fathoms and bottom, and amounted respectively to 37·2 and 44·5 milligrammes per litre. At 11.30 A.M. commenced heaving in trawl. This Station is about 17 miles to the westward of Station 133 of October 11, 1873. Having crossed the old track shortly before stopping this morning, the Challenger to-day completed her circuit round the world. At 1.30 P.M. trawl came up with a few specimens, and a little deposit, while the tow-nets at the trawl and weights also contained some of the ooze. A new rope was used and it came in full of turns, and the trawl-net seemed to have been on its back. Made sail.

Tristan da Cunha distant at noon, 440 miles. Made good 146 miles. Amount of current 7 miles, direction S. 82° E.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Hexactinellida (Schulze, Zool. pt. 53).

Caulocalyx tener, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

Hyalonema sp. (?). Fragment.

Annelida (M'Intosh, Zool. pt. 34).

Buskiella abyssorum, n.g., n.sp. Obtained also at Stations 101 and 106. Only species of the genus.

Cephalopoda (Hoyle, Zool. pt. 44).

Histiopsis atlantica, n.g., n.sp. One specimen; obtained at no other locality. Only species of the genus.

In addition to the above, the Station-book records :—Young specimen of *Umbellula* with two polyps only, *Ophiothrix*, Holothurian, Polyzoon, and young *Ditrupa* attached to a Sponge spicule.

Excluding Protozoa, about a dozen specimens of invertebrates were obtained at this Station, belonging to 9 species, of which 3 are new to science, representatives of 3 new genera ; 2 of the new genera and new species were not obtained elsewhere. STATION 333.

Surface Organisms.—The following species are recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Heliosoma duodecilla, Haeckel.
Actinomma castanomma, Haeckel.
Spongoprunum amphicylindrus, Haeckel.
Sethostaurus conostaurus, Haeckel.
Amphibrachium clavula, Haeckel.
Amphicraspedum wyvilleanum, Haeckel.
Histiastrum pentadiscus, Haeckel.
Tessarastrum spinozæ, Haeckel.
Cannocapsa stethoscopium, Haeckel.
Echinaspis diadema, Haeckel.
Icosaspis spectabilis, Haeckel.
Sagmarium spongodictyum, Haeckel.
Pharyngella gastræa, Haeckel.

SCHIZOPODA (Sars, Zool. pt. 37).

Thysanoëssa gregaria, n.sp.
Nematoscelis megalops, n.g., n.sp.

The tow-nets at the surface and down to 200 fathoms yielded :—*Globigerina*, *Pulvinulina*, Acanthometræ, Challengeridæ, and compound Radiolaria, Siphonophoræ, Ctenophoræ, *Sagitta*, *Cypridina*, *Saphirina* and other Copepods, Amphipods, *Euphausia*, Decapod larvæ, *Atlanta* and larvæ, *Pleuropus* [= *Cavolinia*] and other Pteropods, and many larval fishes.

Station 334 (Sounding 484), Rio de la Plata to Tristan da Cunha (see Chart 16 and Diagram 6). STATION 334.

March 14, 1876 ; lat. 35° 45′ S., long. 18° 31′ W.
Temperature of air at noon, 69°·8 ; mean for the day, 69°·6.
Temperature of water :—

Surface,	68·5	400 fathoms,	40·4
25 fathoms,	64·5	500 „	38·3
50 „	60·3	600 „	37·7
75 „	57·8	700 „	37·4
100 „	56·0	800 „	37·2
125 „	54·0	900 „	37·1
150 „	52·3	1000 „	37·0
175 „	50·6	1130 „	36·8
200 „	49·3	1330 „	36·6
225 „	48·0	1530 „	36·3
250 „	46·6	1730 „	36·1
275 „	45·4	Bottom,	35·8
300 „	44·2		

Station 334.

Density at 60° F. at surface, 1·02607 ; 800 fathoms, 1·02576 ; bottom, 1·02604. Depth, 1915 fathoms ; deposit, Globigerina Ooze, containing 85·21 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 8.30 A.M. got up steam, and at 9.5 A.M. shortened and furled sails and proceeded under steam to sound and trawl. At 10 A.M. laid out trawl and veered 2600 fathoms. At 11.15 A.M. sounded in 1915 fathoms. The sounding-tube had sunk about a foot into the bottom, and brought up a litre of the deposit. Of this there were two layers separated by a thin dark line, an upper layer of a dark brown colour and about eight inches in thickness, composed essentially of the shells of pelagic Foraminifera, and a lower layer, milk white and over an inch in thickness, chiefly made up of amorphous calcareous matter and Coccoliths ; the passage between the two layers appeared to be quite abrupt. Obtained serial temperatures. At 2.30 P.M. commenced heaving in trawl, which came up foul at 5.45 P.M., the net having got twisted round the beam, but it contained a few specimens ; the tow-nets at the weights and at the trawl contained a little of the ooze. Made sail. *Diomedea exulans*, prions, mutton birds, and black night hawks were seen.

Distance at noon from Tristan da Cunha, about 310 miles ; from Ascension Island, 1685 miles. Made good 131 miles. No current.

Animals from Trawl.

The following species are recorded in the Zoological Reports from the trawl at this Station :—

Echinoidea (Agassiz, Zool. pt. 9).

Cystechinus clypeatus, n.g., n.sp. Obtained also at Stations 132 and 205.

Amphipoda (Stebbing, Zool. pt. 67).

Lanceola sp. (?). One specimen.

In addition to the foregoing, the Station-book records :—Sponge fragment, spicule of *Hyalonema*, and several large empty Pteropod shells.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Thalassoplancta brevispicula, Haeckel.
Sphærozoum furculosum, Haeckel.
Lithatractus echiniscus, Haeckel.
Pharyngella gastræa, Haeckel.

Siphonophoræ (Haeckel, Zool. pt. 77).

Diphyopsis compressa, n.g., n.sp.
Anthophysa darwinii, n.sp.

Schizopoda (Sars, Zool. pt. 37).

Siriella thompsoni (M.-Edwards).

Tunicata (Herdman, Zool. pt. 76).

Salpa democratica - mucronata, Forskål.

In addition, the following are recorded in the note-books :—*Globigerina*, *Pulvinulina*, Acanthometræ and compound Radiolaria, *Sagitta*, *Setella* and small blue Copepods, Amphipods, *Sergestes* larvæ, *Atlanta*, *Pleuropus* [= *Cavolinia*] and other Pteropods, and small fishes. The tow-net at the weights contained a little deposit, along with many Challengeridæ and other Radiolaria, red *Cypridinæ*, and ordinary surface organisms. One of the tow-nets at the trawl brought up some surface things mixed with ooze. STATION 334.

Station 335 (Sounding 485), Tristan da Cunha to Ascension Island (see Chart 16 and Diagram 7). STATION 335.

March 16, 1876 ; lat. 32° 24′ S., long. 13° 5′ W.
Temperature of air at noon, 75°·8 ; mean for the day, 73°·2.
Temperature of water :—

	°		°
Surface,	73·5	275 fathoms,	49·5
25 fathoms,	69·8	300 „	48·0
50 „	64·0	400 „	43·0
75 „	61·3	500 „	39·3
100 „	59·3	600 „	37·8
125 „	57·7	700 „	37·1
150 „	56·2	800 „	37·0
175 „	54·8	900 „	37·0
200 „	53·4	1000 „	37·0
225 „	52·0	Bottom,	37·0
250 „	50·8		

Density at 60° F. :—

Surface,	1·02666	300 fathoms,	1·02568
25 fathoms,	1·02650	400 „	1·02602
50 „	1·02645	800 „	1·02639
100 „	1·02633	Bottom,	1·02585
200 „	1·02612		

Depth, 1425 fathoms; deposit, Pteropod Ooze, containing 93·77 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 7.30 A.M. got up steam, and at 8.30 A.M. shortened and furled sails and proceeded under steam to sound and dredge. At 9 A.M. sounded in 1425 fathoms. Put large dredge over and veered 1900 fathoms. Took serial temperatures. At 2 P.M. commenced heaving in dredge, which came up at 3 P.M. with many specimens. The dredge and attached tow-nets brought up about ten litres of the ooze and a few pumice-stones. Made sail. Sea phosphorescent. No birds were seen from this date till approaching Ascension on March 27.

Station 335. Distance at noon from Ascension, 1470 miles; from Tristan da Cunha, 280 miles. Made good 171 miles. Amount of current 17 miles, direction S. 29° E.

Animals from Dredge. The following species are recorded in the Zoological Reports from the dredge at this Station :—

Deep-Sea Medusæ (Haeckel, Zool. pt. 12).

Nauphanta challengeri, n.g., n.sp. Two specimens; obtained at no other locality. Only species of the genus.

Asteroidea (Sladen, Zool. pt. 51).

Hymenaster anomalus, n.sp. Obtained at no other locality.

Echinoidea (Agassiz, Zool. pt. 9).

Salenia hastigera, n.sp. Numerous specimens; for distribution see Station 106.

Annelida (M'Intosh, Zool. pt. 34).

Nothria abranchiata (= *abyssicola*), n.sp. Two specimens; obtained also Station 156.

Ostracoda (Brady, Zool. pt. 3).

Bythocypris elongata, n.g., n.sp. A few valves; obtained at no other locality.
Bairdia victrix, Brady (?). Single valve; for distribution see Station 24.
Cythere (?) *serratula*, n.sp. A few valves; obtained also at Stations 24 and 85.
,, *dictyon*, n.sp. For distribution see Station 24.
,, *dorsoserrata*, n.sp. Obtained at no other locality.
,, *dasyderma*, n.sp. For distribution see Station 5.
,, *irpex*, n.sp. Obtained also at Stations 73 and 78.
Krithe producta, n.sp. For distribution see Station 70.
Cytheropteron fenestratum, n.sp. Obtained also at Station 149.

Cirripedia (Hock, Zool. pt. 25).

Scalpellum velutinum, n.sp. One specimen (attached to pumice-stone); obtained also at Station III.
Verruca incerta, n.sp. Several specimens (on spines of *Salenia*); obtained at no other locality.

Amphipoda (Stebbing, Zool. pt. 67).

Cyphocaris micronyx, n.sp. One specimen; obtained also in deep tow-net at Station 295.

ANOMURA (Henderson, Zool. pt. 69). STATION 335.

Parapagurus abyssorum, M.-Edwards, MS. One specimen; for distribution see Station 56.

GASTEROPODA (Watson, Zool. pt. 42).

Clathurella cala, n.sp. Obtained at no other locality.

FISHES (Günther, Zool. pt. 57).

Chlorophthalmus gracilis, n.sp. One specimen; obtained also at Stations 168 and 300.

In addition to the foregoing, the following are recorded in the Station-book:—Two specimens of *Epizoanthus* (?) on shells containing *Pagurus*, two Tubularians attached to pumice-stones, dead shells of *Dentalium*, *Corbula*, and *Cerithium* on Annelid-tubes, and two specimens of *Rostellaria* with *Pagurus* and *Epizoanthus*.

Excluding Protozoa, over 70 specimens of invertebrates and fishes were obtained at this Station, belonging to about 27 species, of which 17 are new to science, including representatives of 2 new genera; 6 of the new species and 1 new genus were not obtained elsewhere.

ORGANISMS FROM THE DEPOSIT.

The following species of Pteropoda, Foraminifera, and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.):—

PTEROPODA (Pelseneer, Zool. pt. 65).

Limacina inflata (d'Orbigny).
Clio (*Styliola*) *subula* (Quoy and Gaimard).
„ *pyramidata*, Linné.
Cuvierina columnella (Rang).
Cavolinia trispinosa (Lesueur).
„ *inflexa* (Lesueur).

FORAMINIFERA (Brady, Zool. pt. 22).—The pelagic species, which make up about 80 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
„ *ringens* (Lamarck).
Spiroloculina acutimargo, Brady.
„ *tenuis* (Czjzek).
Miliolina seminulum (Linné).
„ *tricarinata* (d'Orbigny).
„ *venusta* (Karrer).
Reophax difflugiformis, Brady.
Haplophragmium canariense (d'Orbigny).
„ *globigeriniforme* (Parker and Jones).
Textularia aspera, Brady.
„ *sagittula*, Defrance.
Gaudryina pupoides, d'Orbigny.
„ „ var. *chilostoma*, Reuss.
Bulimina elongata, d'Orbigny.
„ *rostrata*, Brady.
Virgulina schreibersiana, Czjzek.
Bolivina limbata, Brady.
„ *punctata*, d'Orbigny.
„ *reticulata*, Hantken.
Lagena acuta (Reuss).
„ *exsculpta*, Brady.
„ *formosa*, Schwager.
„ *lævigata* (Reuss).
„ *lævis* (Montagu).

Station 335.

Lagena lagenoides (Williamson).
„ *longispina*, Brady.
„ *seminiformis*, Schwager.
Nodosaria communis, d'Orbigny.
„ *hispida*, d'Orbigny.
Vaginulina legumen (Linné).
Cristellaria italica (Defrance), var. *volpicellii*, Costa.
Polymorphina angusta, Egger.
Uvigerina asperula, Czjzek.
„ *pygmæa*, d'Orbigny.
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *cretacea*, d'Orbigny (?).
× „ *inflata*, d'Orbigny.
× „ *rubra*, d'Orbigny.
× *Orbulina universa*, d'Orbigny.
× *Hastigerina pelagica* (d'Orbigny).
Pullenia sphæroides (d'Orbigny).
× *Sphæroidina dehiscens*, Parker and Jones.
× *Candeina nitida*, d'Orbigny.
Spirillina limbata, Brady.
Truncatulina ungeriana (d'Orbigny).
„ *wuellerstorfi* (Schwager).
× *Pulvinulina canariensis* (d'Orbigny).
× „ *crassa* (d'Orbigny).
„ *elegans* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
× „ *patagonica* (d'Orbigny).
„ *pauperata*, Parker and Jones.
× „ *tumida*, Brady.
Rotalia orbicularis, d'Orbigny.
„ *soldanii*, d'Orbigny.

Radiolaria (Haeckel, Zool. pt. 40).

Xiphostylus cuculus, Haeckel.
Stylosphæra erato, Haeckel.
Spongostylus hastatus, Haeckel.
Hexastylus periandri, Haeckel.
Cromyatractus tetracelyphus, Haeckel.
Zonodiscus saturnalis, Haeckel.
Theodiscus vanitatis, Haeckel.
Sethodiscus micrococcus, Haeckel.
Staurocyclia phacostaurus, Haeckel.
Larnacoma quadruplex, Haeckel.
Cubotholus rhombicus, Haeckel.
Zygocircus rhombicus, Haeckel.
Brachiospyris ocellata, Haeckel.
Zygospyris quadrupes, Haeckel.
Petalospyris lobata, Haeckel.
Botryocampe theocapsa, Haeckel.
Sethopyramis hexagonalis, Haeckel.
Plectopyramis lagena, Haeckel.
Podocyrtis nana, Ehrenberg.
Theocyrtis macroceros, Haeckel.
Lithocampe diaphana, Haeckel.
Orosphæra arborescens, Haeckel.
Challengeria campbelli, Murray.
„ *trigona*, Haeckel.
Challengeron tizardi, Murray.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Diplocolpus cristatus, Haeckel.
Pterocorys macroptera, Haeckel.
Caloplegma tetradecastylum, Haeckel.

Copepoda (Brady, Zool. pt. 23).

Scolecithrix danæ (Lubbock).
Acartia denticornis, n.sp.
Ætidius armatus, n.g., n.sp.
Oithona challengerii, n.sp.
Corycæus varius, Dana.
Saphirina ovalis, Dana.
„ *angusta*, Dana.

In addition, the following are recorded in the note-books from the tow-nets at the surface and down to 200 fathoms :—*Pyrocystis noctiluca* and *Pyrocystis fusiformis*, *Peridinium tripos*, *Ethmodiscus*, *Coscinodiscus*, and other Diatoms, *Globigerina*,

Hastigerina, *Pulvinulina menardii*, Acanthometræ, Polycystinæ, and compound Radiolaria, several forms of Siphonophoræ, *Sagitta*, *Tomopteris*, *Alciopa*, Planarian larvæ, *Evadne*, *Copilia* and other Copepods, *Lucifer*, *Sergestes* and other Decapod larvæ, *Atlanta*, several forms of Pteropods and larvæ, and small fishes. The tow-nets at the weights came up wound round the line, but contained a few Challengeridæ and some living and dead Foraminifera. Some of the *Globigerinæ* were surrounded with a circle of sarcode, in which were entangled a great many Coccospheres, Rhabdospheres, *Peridinium*, and minute Infusorians. Station 335.

Station 336 (Sounding 486), Tristan da Cunha to Ascension Island (see Chart 16 and Diagram 7). Station 336.

March 18, 1876 ; lat. 27° 54′ S., long. 13° 13′ W.

Temperature of air at noon, 69°·8 ; mean for the day, 71°·6.

Temperature of water :—

	°		°
Surface,	76·0	400 fathoms,	41·7
25 fathoms,	69·8	500 „	39·1
50 „	65·0	600 „	38·2
75 „	62·0	700 „	38·1
100 „	59·7	800 „	37·9
125 „	57·5	900 „	37·8
150 „	55·5	1000 „	37·7
175 „	54·8	1100 „	37·5
200 „	51·9	1200 „	37·4
225 „	50·3	1300 „	37·2
250 „	48·7	1400 „	37·1
275 „	47·3	1500 „	37·0
300 „	46·1	Bottom,	36·5

Density at 60° F. :—

Surface,	1·02693	300 fathoms,	1·02589
25 fathoms,	1·02670	400 „	1·02561
50 „	1·02653	800 „	1·02585
100 „	1·02632	Bottom,	1·02590
200 „	1·02596		

Depth, 1890 fathoms ; deposit, Globigerina Ooze, containing 79·02 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5 A.M. shortened and furled sails, and proceeded under steam to sound. At 6 A.M. sounded in 1890 fathoms. Only a small quantity of deposit came up in the sounding-tube. Obtained serial temperatures down to 1500 fathoms. At 10.30 A.M. completed observations and made sail to a strong south-easter, the ship going 10½ knots at noon.

Station 336. Distance at noon from Ascension, 1182 miles. Made good 167 miles. No current observed.

Organisms from Surface-Nets. **Surface Organisms.**—Two hauls of the tow-net near the surface yielded much the same kind of things as at the previous Station, including *Pyrocystis*, *Sagitta*, Copepods, and *Lucifer*.

Station 337. **Station 337** (Sounding 487), Tristan da Cunha to Ascension Island (see Chart 16 and Diagram 7).

March 19, 1876 ; lat. 24° 38′ S., long. 13° 36′ W.

Temperature of air at noon, 78°·8 ; mean for the day, 74°·9.

Temperature of water :—

	°		°
Surface, ...	77·0	275 fathoms, . . .	49·5
25 fathoms, . . .	72·0	300 „ . . .	48·0
50 „ . . .	68·2	400 „ . . .	42·0
75 „ . . .	65·1	500 „ . . .	39·3
100 „ . . .	63·0	600 „ . . .	38·7
125 „ . . .	61·0	700 „ . . .	38·4
150 „ . . .	59·0	800 „ . . .	38·1
175 „ . . .	57·0	900 „ . . .	37·9
200 „ . . .	55·0	1000 „ . . .	37·7
225 „ . . .	53·1	Bottom, . . .	37·2
250 „ . . .	51·2		

Density at 60° F. :—

Surface, . . .	1·02704	100 fathoms, . . .	1·02649
25 fathoms, . . .	1·02707	Bottom, . . .	1·02639
50 „ . . .	1·02658		

Depth, 1240 fathoms; deposit, Pteropod Ooze, containing 98·47 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 11.30 A.M. shortened and furled sails, and proceeded under steam to sound. At noon sounded in 1240 fathoms. Put large dredge over and veered 1600 fathoms. Took serial temperatures down to 1000 fathoms. At 4 P.M. commenced heaving in dredge, which came up at 5.30 P.M., having probably been only a short time in contact with the bottom ; the bag contained a very small quantity of the deposit. Made sail.

Distance at noon from Ascension, 1002 miles. Made good 182 miles. Amount of current for the last two days 27 miles, direction S. 51° W.

Animal from Dredge. The following species is recorded from this Station :—

Fishes (Günther, Zool. pt. 57).

Gonostoma microdon, n.sp. One specimen ; for distribution see Station 23.

FORAMINIFERA (Brady, Zool. pt. 22).—The following species of Foraminifera were observed in the deposit from this Station ; the sixteen species enumerated are all pelagic, and make up about 50 per cent. of the carbonate of lime present in the deposit :— STATION 337. ORGANISMS FROM THE DEPOSIT.

× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *inflata*, d'Orbigny.
× „ *rubra*, d'Orbigny.
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Hastigerina pelagica* (d'Orbigny).
× *Sphæroidina dehiscens*, Parker and Jones.
× *Candeina nitida*, d'Orbigny.
× *Pulvinulina canariensis* (d'Orbigny).
× „ *crassa* (d'Orbigny) (?).
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
× „ *patagonica* (d'Orbigny).
× „ *tumida*, Brady.

Surface Organisms.—The following species are recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

PTEROPODA (Pelseneer, Zool. pt. 65).

Limacina inflata (d'Orbigny).
„ *lesueuri* (d'Orbigny).
„ *trochiformis* (d'Orbigny).
„ *bulimoides* (d'Orbigny).
Clio (*Hyalocylix*) *striata* (Rang).
„ (*Styliola*) *subula* (Quoy and Gaimard).
Cavolinia quadridentata (Lesueur).

The surface tow-nets yielded relatively very few things, including Copepods and *Velellæ*, while the tow-net at the weights was wound round the line and almost empty, the tow-nets at the dredge containing a few Foraminifera and Pteropod shells similar to those in the sounding.

Station 338 (Sounding 488), Tristan da Cunha to Ascension Island (see Chart 16 and Diagram 7). STATION 338.

March 21, 1876 ; lat. 21° 15′ S., long. 14° 2′ W.
Temperature of air at noon, 76°·3 ; mean for the day, 76°·4.
Temperature of water :—

	°		°
Surface,	76·5	400 fathoms,	38·8
25 fathoms,	75·4	500 „	38·1
50 „	71·5	600 „	38·0
75 „	67·2	700 „	37·9
100 „	63·0	800 „	37·8
125 „	59·3	900 „	37·7
150 „	55·3	1000 „	37·6
175 „	52·3	1100 „	37·5
200 „	49·9	1200 „	37·4
225 „	48·0	1300 „	37·3
250 „	46·0	1400 „	37·2
275 „	44·4	1500 „	37·1
300 „	43·0	Bottom,	36·4

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Density at 60° F. :—

Surface,	1·02752	200 fathoms,	1·02594
25 fathoms,	1·02720	300 „	1·02647
50 „	1·02704	400 „	1·02654
100 „	1·02666		

Depth, 1990 fathoms; deposit, Globigerina Ooze, containing 92·54 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 9 A.M. shortened and furled sails, and proceeded under steam to sound and dredge. At 9.40 A.M. sounded in 1990 fathoms. At 11 A.M. put dredge over and veered 2600 fathoms. Took serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 50, 100, and 200 fathoms, and amounted respectively to 37·3, 36·8, and 43·1 milligrammes per litre. At 4 P.M. commenced heaving in dredge, which came up at 7 P.M. filled with deposit. Made sail.

Distance at noon from Ascension, 798 miles. Made good 123 miles. Amount of current 19 miles, direction S. 47° W.

Animals from Dredge.

The following species is recorded from this Station :—

Siphonophoræ (Haeckel, Zool. pt. 77).

Salacia polygastrica, n.g., n.sp. One specimen; obtained at no other locality.

The Station-book records also a whisp of *Hyalonema* spicules, and a small broken Gasteropod.

Organisms from the Deposit

The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :—

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 86 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
„ „ var. *murrhyna*, Schwager.
Spiroloculina tenuis (Czjzek).
Miliolina gracilis (d'Orbigny).
„ *seminulum* (Linné).
„ *venusta* (Karrer).
Hyperammina ramosa, Brady.
„ *vagans*, Brady.
Rhizammina algæformis, Brady.
Reophax difflugiformis, Brady.
„ *scorpiurus*, Montfort.
Thurammina papillata, Brady.
Trochammina pauciloculata, Brady.
Cyclammina cancellata, Brady.
Textularia agglutinans, d'Orbigny.
Verneuilina pygmæa (Egger).
Gaudryina pupoides, d'Orbigny.
Virgulina schreibersiana, Czjzek.
„ *subsquamosa*, Egger.
Cassidulina bradyi, Norman.
„ *subglobosa*, Brady.
Lagena apiculata, Reuss.
„ *desmophora*, Rymer Jones.
„ *formosa*, Schwager.
„ „ var. *comata*, Brady.
„ *globosa* (Montagu).
„ *gracilis*, Williamson.
„ *lævigata* (Reuss).

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Lagena lævis (Montagu).
„ *lagenoides* (Williamson).
„ „ var. *tenuistriata*, Brady.
„ *longispina*, Brady.
„ *lucida* (Williamson).
„ *plumigera*, Brady.
„ *seminiformis*, Schwager.
„ *squamosa* (Montagu).
„ *stelligera*, Brady.
„ *striata* (d'Orbigny).
Nodosaria calomorpha, Reuss.
Cristellaria obtusata, Reuss.
„ *rotulata* (Lamarck).
Polymorphina angusta, Egger.
„ *lactea* (Walker and Jacob).
„ *longicollis*, Brady.
Uvigerina asperula, Czjzek.
„ *pygmæa*, d'Orbigny.
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ „ var. *triloba*, Reuss.
× „ *conglobata*, Brady.
× „ *digitata*, Brady.
× „ *dubia*, Egger.
× *Globigerina helicina*, d'Orbigny.
× „ *inflata*, d'Orbigny.
× „ *rubra*, d'Orbigny.
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Hastigerina pelagica* (d'Orbigny).
× *Pullenia obliquiloculata*, Parker and Jones.
„ *quinqueloba*, Reuss.
„ *sphæroides* (d'Orbigny).
× *Sphæroidina deliscens*, Parker and Jones.
× *Candeina nitida*, d'Orbigny.
Truncatulina haidingerii (d'Orbigny).
„ *wuellerstorfi* (Schwager).
× *Pulvinulina canariensis* (d'Orbigny).
× „ *crassa* (d'Orbigny).
„ *favus*, Brady.
× „ *menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
× „ *patagonica* (d'Orbigny).
„ *pauperata*, Parker and Jones.
× „ *tumida*, Brady.
Rotalia soldanii, d'Orbigny.
Nonionina scapha (Fichtel and Moll).
„ *umbilicatula* (Montagu).

Radiolaria (Haeckel, Zool. pt. 40).

Haliomma rhodococcus, Haeckel.
Axoprunum stauraxonium, Haeckel.
Cenolarcus triaxonius, Haeckel.
Octopyle stenozona, Haeckel.
Polyplecta decacantha, Haeckel.
Zygocircus tetragonus, Haeckel.
Dystympanium dictyoclia, Haeckel.
Dendrospyris furcata, Haeckel.
Cantharospyris carabus, Haeckel.
Dictyospyris polystoma, Haeckel.
Tripodiscium furcatum, Haeckel.
Cinclopyramis infundibulum, Haeckel
Lychnodictyum challengeri, Haeckel
Anthocyrtis ventricosa, Ehrenberg.
Dictyocephalus hispidus, Ehrenberg.
Thyrsocyrtis furcata, Haeckel.
Theopera cortina, Haeckel.
Theocyrtis aspera, Haeckel.
Stichocapsa cylindrica, Haeckel.
Oroplegma velatum, Haeckel.
Conchoceras cornutum, Haeckel.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Organisms from Surface-Nets.

Radiolaria (Haeckel, Zool. pt. 40).

Spongodictyon cavernosum, Haeckel.
Siphonosphæra socialis, Haeckel.
Hystrichaspis foveolata, Haeckel.
Coscinaspis coscinopora, Haeckel.
Lychnaspis giltschii, Haeckel.
Octopelta cultella, Haeckel.
Dorypelta stauroptera, Haeckel.
Plagoniscus cortinarius, Haeckel.
Bathropyramis medusa, Haeckel.
Arachnocorys enneaptera, Haeckel.
Cœloplegma tetradecastylum, Haeckel.

Station 338.

Siphonophoræ (Haeckel, Zool. pt. 77.)

Calpe gegenbauri, n.sp.

Schizopoda (Sars, Zool. pt. 37).

Thysanopoda tricuspidata, M.-Edwards.

Stylocheiron carinatum, n.g., n.sp.

Pteropoda (Pelseneer, Zool. pt. 65).

Cavolinia longirostris (Lesueur).

Cephalopoda (Hoyle, Zool. pt. 44).

Grenacher's pelagic larva.

The tow-nets at the surface and down to 150 fathoms yielded: — *Ceratium* (*Peridinium*) *tripos* (*in catena*), *Pyrocystis*, *Ethmodiscus* and other Diatoms, *Halosphæra*, *Hastigerina*, *Pulvinulina menardii*, Acanthometræ, Polycystinæ, and compound Radiolaria, Medusæ, Siphonophoræ, *Sagitta*, *Tomopteris*, *Alciopa*, *Evadne*, *Cypridina*, *Copilia*, *Saphirina*, and other Copepods, Hyperids, *Euphausia*, *Sergestes*, small shells (*Ianthina* ?), *Pleuropus* [= *Cavolinia*] and other Pteropods and larvæ, small Cephalopods (*Cranchia*), *Doliolum*, and small fishes. The tow-net at the weights contained deep-sea Radiolaria and a red deep-sea Amphipod, while the tow-nets at the dredge brought up a little ooze.

Station 339.

Station 339 (Sounding 489), Tristan da Cunha to Ascension Island (see Chart 16 and Diagram 7).

March 23, 1876; lat. 17° 26′ S., long. 13° 52′ W.
Temperature of air at noon, 79°·8; mean for the day, 76°·3.
Temperature of water:—

	°		°
Surface,	76·0	150 fathoms,	52·7
10 fathoms,	75·8	160 „	51·8
20 „	75·4	170 „	51·0
30 „	74·3	180 „	50·2
40 „	72·3	190 „	49·6
50 „	70·0	200 „	49·0
60 „	67·7	300 „	43·0
70 „	65·5	400 „	39·8
80 „	63·5	500 „	39·5
90 „	61·6	600 „	39·2
100 „	59·8	700 „	38·9
110 „	58·0	800 „	38·6
120 „	56·4	900 „	38·3
130 „	55·1	1000 „	38·1
140 „	53·8	Bottom,	37·2

Density at 60° F. :— STATION 339

Surface,	1·02775	200 fathoms,	1·02582
25 fathoms,	1·02715	300 „	1·02559
50 „	1·02697	400 „	1·02560
100 „	1·02639	Bottom,	1·02568

Depth, 1415 fathoms; deposit, Pteropod Ooze, containing 95·61 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 8 A.M. got up steam. At 9.40 A.M. shortened and furled sails, and proceeded under steam to sound. At 10 A.M. sounded in 1415 fathoms. The sounding-tube sunk ten inches into the bottom, and brought up over a litre of the ooze; many of the Pteropod, Heteropod, and Foraminifera shells were coloured black or brown by the oxides of manganese and iron. Took serial temperatures down to 1000 fathoms. The carbonic acid was determined in water from 400 fathoms, and amounted to 43·6 milligrammes per litre. At 12.30 P.M. completed observations and made sail.

Ascension Island distant at noon, 570 miles; St. Helena, 480 miles. Made good 134 miles. Amount of current 8 miles, direction S. 83° W.

Surface Organisms.—The following species is recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

PTEROPODA (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *acicula* (Rang).

The tow-nets at the surface and down to 100 fathoms yielded among other organisms:—*Hastigerina*, Acanthometræ, Polycystinæ, and compound Radiolaria, Medusæ, Siphonophoræ, *Cypridina*, Copepods, and *Amphion*.

Station 340 (Sounding 490), Tristan da Cunha to Ascension Island (see Chart 16 and Diagram 7). STATION 340.

March 24, 1876; lat. 14° 33′ S., long. 13° 42′ W.

Temperature of air at noon, 77°·8; mean for the day, 76°·7.

Temperature of water:—

Surface,	77°·2	40 fathoms,	74°·1
10 fathoms,	77·0	50 „	72·3
20 „	76·4	60 „	69·8
30 „	75·7	70 „	67·3

Station 340.

	°		°
80 fathoms,	64·3	225 fathoms,	45·7
90 „	61·5	250 „	44·3
100 „	58·8	275 „	43·0
110 „	56·2	300 „	42·0
120 „	54·3	400 „	39·9
130 „	53·0	500 „	39·4
140 „	52·2	600 „	39·2
150 „	51·3	700 „	39·0
160 „	50·4	800 „	38·8
170 „	49·5	900 „	38·6
180 „	48·6	1000 „	38·4
190 „	47·7	Bottom,	37·6
200 „	46·9		

Density at 60° F.:—

Surface,	1·02752	300 fathoms,	1·02575
25 fathoms,	1·02730	400 „	1·02637
50 „	1·02725	800 „	1·02562
100 „	1·02635	Bottom,	1·02598
200 „	1·02731		

Depth, 1500 fathoms ; deposit, Pteropod Ooze.

At 1.15 P.M. shortened and furled sails, and proceeded under steam to sound. At 2 P.M. sounded in 1500 fathoms. Took serial temperatures down to 1000 fathoms. The carbonic acid was determined in water from the surface and 800 fathoms, and amounted respectively to 35·3 and 43·6 milligrammes per litre. At 4.20 P.M. completed temperatures, and at 4.30 P.M. made sail.

Ascension Island distant at noon, 414 miles ; St Helena, 460 miles. Made good 158 miles. Amount of current 19 miles, direction S. 81° W.

Organisms from Surface-Nets.

Surface Organisms.—The tow-nets near the surface yielded :—*Globigerina*, *Hastigerina*, Acanthometræ and compound Radiolaria, Medusæ, Siphonophoræ, *Sagitta*, *Cypridina*, Copepods, Phronimids, *Euphausia*, larval Pteropods, *Appendicularia*, *Salpa* (with Coccospheres and other minute organisms in the stomachs).

Station 341.

Station 341 (Sounding 491), Tristan da Cunha to Ascension Island (see Chart 16 and Diagram 7).

March 25, 1876 ; lat. 12° 16′ S., long. 13° 44′ W.

Temperature of air at noon, 78°·3 ; mean for the day, 77°·5.

Temperature of water :— STATION 341.

Surface,	79·0°	170 fathoms,	49·3°
10 fathoms,	79·0	180 „	48·5
20 „	78·2	190 „	47·8
30 „	76·7	200 „	47·0
40 „	74·2	225 „	45·8
50 „	71·4	250 „	44·7
60 „	68·2	275 „	43·5
70 „	64·8	300 „	42·6
80 „	61·8	400 „	40·3
90 „	59·2	500 „	39·3
100 „	57·3	600 „	39·0
110 „	55·4	700 „	38·9
120 „	54·0	800 „	38·8
130 „	52·7	900 „	38·7
140 „	51·6	1000 „	38·6
150 „	50·8	Bottom,	38·2
160 „	50·0		

Density at 60° F.:—

Surface,	1·02706	300 fathoms,	1·02617
25 fathoms,	1·02706	400 „	1·02560
50 „	1·02715	800 „	1·02563
100 „	1·02606	Bottom,	1·02601
200 „	1·02598		

Depth, 1475 fathoms ; deposit, Pteropod Ooze.

At 1.45 P.M. shortened and furled sails, and proceeded under steam to sound. At 2.30 P.M. sounded in 1475 fathoms. The sounding-tube contained only a few Pteropod shells, Foraminifera, and small particles of peroxide of manganese. On the outside of the tube were several black streaks due to peroxide of manganese. Took serial temperatures down to 1000 fathoms. At 4.30 P.M. completed temperatures and made all plain sail.

Ascension Island distant at noon, 275 miles. Made good 140 miles. Amount of current 15 miles, direction S. 72° W.

Surface Organisms.—The following species are recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

OSTRACODA (Brady, Zool. pt. 3).
Halocypris atlantica, Lubbock.
„ *brevirostris*, Dana.

COPEPODA (Brady, Zool. pt. 23).
Euchæta prestandreæ, Philippi.
Oithona challengerii, n.sp.
Corycæus varius, Dana.
„ *limbatus*, n.sp.
Lubbockia squillimana, Claus.

Station 341. The tow-nets near the surface yielded a greater abundance of organisms than at the last few Stations, including:—*Pyrocystis*, *Ethmodiscus*, *Globigerina*, *Orbulina*, Acanthometræ, Polycystinæ, and compound Radiolaria, Siphonophoræ, *Sagitta*, *Tomopteris*, *Alciopa*, *Cypridina*, Copepods, Amphipods, *Euphausia*, *Sergestes* larvæ, *Pleuropus* [= *Carolinia*] and other Pteropods and other small shells, *Doliolum*, and *Appendicularia*.

Station 342. **Station 342** (Sounding 492), Tristan da Cunha to Ascension Island (see Chart 16 and Diagram 7).

March 26, 1876; lat. 9° 43′ S., long. 13° 51′ W.
Temperature of air at noon, 79°·5; mean for the day, 78°·9.
Temperature of water:—

	°		°
Surface,	80·0	170 fathoms,	49·5
10 fathoms,	80·2	180 „	49·0
20 „	80·0	190 „	48·4
30 „	78·8	200 „	47·8
40 „	76·0	225 „	46·9
50 „	71·5	250 „	45·9
60 „	67·2	275 „	45·1
70 „	62·3	300 „	44·5
80 „	58·3	400 „	42·5
90 „	55·7	500 „	40·8
100 „	54·4	600 „	39·7
110 „	53·7	700 „	39·1
120 „	52·9	800 „	38·8
130 „	52·1	900 „	38·4
140 „	51·3	1000 „	38·2
150 „	50·6	Bottom,	37·5
160 „	50·0		

Density at 60° F.:—

Surface,	1·02721	300 fathoms,	1·02602
25 fathoms,	1·02708	400 „	1·02564
50 „	1·02688	900 „	1·02589
100 „	1·02599	Bottom,	1·02600
200 „	1·02612		

Depth, 1445 fathoms; deposit, Pteropod Ooze.

At 3 P.M. shortened and furled sails, and proceeded under steam to sound. At

3.30 P.M. sounded in 1445 fathoms. The sounding-tube contained only a small quantity of deposit; many of the Pteropod shells in the ooze were covered with a thin coating of manganese. Took serial temperatures down to 1000 fathoms. The carbonic acid was determined in water from 400 fathoms, and amounted to 44·1 milligrammes per litre. At 5.45 P.M. completed temperatures and made sail. STATION 342.

Ascension Island distant at noon, 132 miles. Made good 143 miles. Amount of current 14 miles, direction S. 60° W.

Surface Organisms.—The following species are recorded from the surface at this Station:— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).
- *Rhaphidozoum ascensionis*, Haeckel.
- *Siphonosphæra socialis*, Haeckel.
- *Dicranastrum antilope*, Haeckel.
- *Xiphacantha ciliata*, Haeckel.
- *Lychnaspis giltschii*, Haeckel.
- *Icosaspis elegans*, Haeckel.
- *Conchidium argiope*, Haeckel.
- *Cœloplegma tetradecastylum*, Haeckel.

COPEPODA (Brady, Zool. pt. 23).
- *Calanus propinquus*, n.sp.
- ,, *gracilis*, Dana.
- *Undina vulgaris*, Dana.
- *Scolecithrix danæ* (Lubbock).
- *Euchæta prestandreæ*, Philippi.
- *Candace truncata*, Dana.
- *Centropages violaceus* (Claus).
- *Oithona challengerii*, n.sp.
- *Setella gracilis*, Dana.
- *Corycæus varius*, Dana.
- ,, *pellucidus*, Dana.
- *Copilia mirabilis*, Dana.
- *Lubbockia squillimana*, Claus.
- *Oncæa obtusa*, Dana.

The organisms obtained in the surface tow-nets indicated a truly tropical state of things, and included:—*Peridinium tripos*, *Pyrocystis*, *Ethmodiscus*, *Coscinodiscus*, and other Diatoms, *Globigerina*, *Pullenia*, *Sphæroidina*, *Pulvinulina*, Acanthometræ, Polycystinæ, compound and other Radiolaria, Medusæ, Siphonophoræ, larval Ctenophoræ (?), Holothurian larvæ, *Sagitta*, *Tomopteris*, *Alciopa*, *Cypridina*, Copepods, Decapods and larvæ, *Atlanta*, Pteropods and larvæ, *Appendicularia*, and *Salpa*.

Station 343 (Sounding 493), off Ascension (see Chart 43). STATION 343.

March 27, 1876; lat. 8° 3′ S., long. 14° 27′ W.

Temperature of air at noon, 76°·3; mean for the day, 78°·2.

Station 343.

Temperature of water :—

	°		°
Surface, . . .	80·8	130 fathoms, . . .	51·1
10 fathoms, . . .	80·5	140 „ . . .	50·2
20 „ . . .	80·0	150 „ . . .	49·7
30 „ . . .	77·0	160 „ . . .	49·1
40 „ . . .	72·5	170 „ . . .	48·4
50 „ . . .	67·0	180 „ . . .	47·8
60 „ . . .	62·0	190 „ . . .	47·1
70 „ . . .	58·0	200 „ . . .	46·6
80 „ . . .	56·3	225 „ . . .	45·6
90 „ . . .	55·0	250 „ . . .	45·0
100 „ . . .	53·8	275 „ . . .	44·3
110 „ . . .	52·8	300 „ . . .	43·8
120 „ . . .	52·0	Bottom, . . .	40·4

Density at 60° F. at surface, 1·02688 ; bottom, 1·02612.

Depth, 425 fathoms ; deposit, Globigerina Ooze, containing 96·80 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 9.30 A.M. observed Ascension Island to the N.E. Shortly before noon stopped to sound. At noon sounded in 425 fathoms ; the sounding-tube brought up two pieces of Coral coated with manganese. Put dredge over and veered 800 fathoms. Obtained serial temperatures down to 300 fathoms. At 2.45 P.M. hove up dredge, with a few specimens attached to the swabs and a little deposit. Proceeded towards Ascension, and at 4.50 P.M. stopped and anchored in 11 fathoms in Clarence Bay, off Fort Thornton, Georgetown. Wide-awakes, boobies, and shags were seen during the day.

Animals from Dredge.

The following species are recorded in the Zoological Reports from the dredge at this Station :—

Alcyonaria (Wright and Studer, Zool. pt. 64).

Dasygorgia melanotrichos, n.sp. Stem and several branches ; obtained at no other locality.

Antipatharia (Brook, Zool. pt. 80).

Dendrobrachia fallax, n.g., n.sp. Two specimens ; obtained at no other locality. Only species of the genus.

Corals (Moseley, Zool. pt. 7).

Caryophyllia lævicostata, n.sp. One specimen (attached to a dead Stylasterid) ; obtained at no other locality.

Station 343.

Asteroidea (Sladen, Zool. pt. 51).

Pararchaster spinosissimus, n.g., n.sp. Several specimens; obtained at no other locality.

Plutonaster marginatus, n.g., n.sp. Obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha lepida, n.sp. Several specimens; obtained also at Stations 45, 46, 79, and Bermuda.

Ophiocreas œdipus, n.sp. Obtained also at Stations 214 and 344.

Echinoidea (Agassiz, Zool. pt. 9).

Echinus acutus, Lamarck. Many specimens; obtained also at Stations 46 and 170.

Anomura (Henderson, Zool. pt. 69).

Munida microphthalma, M.-Edwards. One specimen; obtained also at Stations 24 and 171.

In addition to the foregoing, the following are recorded in the Station-book:—Two specimens of *Aphrocallistes*, and two specimens of *Spongodes*.

Excluding Protozoa, over 50 specimens of invertebrates were obtained at this Station, belonging to about 11 species, of which 7 are new to science, including representatives of 3 new genera; 5 of the new species and 1 new genus were not obtained elsewhere.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station:—

Radiolaria (Haeckel, Zool. pt. 40).

Rhaphidozoum pandora, Haeckel.
Siphonosphæra socialis, Haeckel.
Solenosphæra ascensionis, Haeckel.
Leptosphæra stellata, Haeckel.
Amphipyle stenoptera, Haeckel.
Xiphacantha ciliata, Haeckel.
Amphilonche lanceolata, Haeckel.
Phractaspis complanata, Haeckel.
Stauraspis stauracantha, Haeckel.
Lychnaspis giltschii, Haeckel.
,, *undulata*, Haeckel.
Icosaspis elegans, Haeckel.
Conchidium argiope, Haeckel.

Siphonophoræ (Haeckel, Zool. pt. 77).

Eudoxella didyma, n.g., n.sp.

The tow-nets near the surface gave abundance of organisms, principally *Globigerinæ*, *Orbulinæ*, and *Pulvinulinæ*, along with all the things noted at the previous Station.

At Ascension.

The Challenger remained at Ascension from 5 P.M. on March 27 till 5.30 A.M. on April 3, 1876 (for description of the island see *Narr. Chall. Exp.*, vol. i. pp. 926–929).

Ascension. The deposit in 7 fathoms at the anchorage was a Coral Sand, containing 96·56 per cent. of carbonate of lime. The following species are recorded in the Zoological Reports as having been obtained in shallow water and on shore during the stay at Ascension :—

Animals from Ascension.

Echinoidea (Agassiz, Zool. pt. 9).

Echinometra subangularis, Leske. (Shore) ; obtained also at Cape Verdes.

Ostracoda (Brady, Zool. pt. 3).

Pontocypris simplex, n.sp. (7 fathoms) ; obtained at no other locality.
Cythere audei, Brady. (7 fathoms) ; obtained also at Station 149.

Brachyura (Miers, Zool. pt. 49).

Pseudozius bouvieri (M.-Edwards), var. *mellissii*, nov. Obtained at no other locality by the Challenger. Recorded from St. Helena and Cape Verdes.
Geocarcinus lagostoma, M.-Edwards (?). Obtained also at Bermuda.
Grapsus maculatus (Catesby). (Shore) ; obtained also at Bermuda, St. Paul's Rocks, Fernando Noronha, and Cape Verdes.

Gasteropoda (Watson, Zool. pt. 42).

Purpura (*Stramonita*) *fasciata*, Reeve. (Shore) ; obtained at no other locality by the Challenger. Recorded from Antilles.

Cephalopoda (Hoyle, Zool. pt. 44).

Octopus occidentalis, Steenstrup, MS. Obtained at no other locality by the Challenger. Recorded from Cuba.

Fishes (Günther, Zool. pt. 6).

Carcharias obscurus, Les. Obtained also at Station 348.
Serranus impetiginosus, M. and T. Obtained at no other locality by the Challenger.
Sargus argenteus, C.V. Obtained at no other locality by the Challenger.
Holocentrum longipinne, C.V. Obtained also at St. Thomas.
Lichia glauca, L. Obtained also at Cape Verdes.
Caranx ascensionis, Forst. Obtained also at St. Paul's Rocks.
Blennophis webbi, Val. Obtained at no other locality by the Challenger.
Antennarius multiocellatus, C.V. Obtained at no other locality by the Challenger.
Glyphidodon saxatilis, L. Obtained also at St. Paul's Rocks.
Julis ascensionis, Q. and G. Obtained at no other locality by the Challenger.
Belone trachura, C.V. Obtained at no other locality by the Challenger.
Muræna moringua, Cuvier. Obtained at no other locality by the Challenger.

SOUNDINGS AND STATIONS

in the vicinity of

ASCENSION 1.

For explanation of abbreviations &c. see Appendix 1.

420 (344)
calc. volcanic sand.

425 (343)
globigerina ooze

14°35′ 30′ 25′ 20′ 14°15′ Long. West from Greenwich

50′ 55′ 8° 5′

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NATURAL HISTORY

Monacanthus scriptus, Osbeck. Obtained at no other locality by the Challenger. ASCENSION.
Balistes vetula, L. Obtained at no other locality by the Challenger.
„ *buniva*, Lac. Obtained also at St. Paul's Rocks and Sandwich Islands.

GREEN TURTLE (Parker, Zool. pt. 5).

Chelone viridis, Schneider.

In the foregoing list 24 species are enumerated, of which 2 are new to science, and were not obtained elsewhere.

Surface Organisms. — The following species is recorded from the surface off Ascension :— ORGANISMS FROM SURFACE-NETS.

SCHIZOPODA (Sars, Zool. pt. 37).

Nematoscelis rostrata, n.g., n.sp.

When at anchor the tow-net procured many larvæ of Ctenophoræ (?) and Zoëæ.

Station 344 (Sounding 494), off Ascension (see Chart 43). STATION 344.

April 3, 1876 ; lat. 7° 54′ 20″ S., long. 14° 28′ 20″ W.
Temperature of air at noon, 81°·8 ; mean for the day, 80°·5.
Temperature of water at surface, 82°·0.
Density at 60° F. at surface, 1·02658.
Depth, 420 fathoms ; deposit, Calcareous Volcanic Sand, containing 71·65 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5.30 A.M. weighed anchor and proceeded out of Clarence Bay to swing ship for errors of compass and needle. At noon sounded in 420 fathoms ; the sounding-tube brought up a few pieces of dead shells and Corals. At 1 P.M. put dredge over and veered 700 fathoms. At 1.30 P.M. commenced heaving in dredge, which came up at 2 P.M. with numerous specimens, mostly attached to the swabs. A little sand was obtained in the dredge and attached tow-net ; many of the rock fragments, shells, and Corals were quite black from a coating of manganese. Made sail and proceeded towards St. Vincent, Cape Verdes, distant about 1400 miles. One or two small Thalassidromas and a large flock of wide-awakes were seen.

The following species are recorded in the Zoological Reports from the dredge at this Station :— ANIMALS FROM DREDGE.

ALCYONARIA (Wright and Studer, Zool. pt. 64).

Stenella johnsoni, n.sp. One specimen ; obtained at no other locality.
Callistephanus koreni, n.g., n.sp. Fragments ; obtained at no other locality. Only species of the genus.

Station 344.

Antipatharia (Brook, Zool. pt. 80).

Taxipathes recta, n.g., n.sp. Many specimens; obtained at no other locality. Only species of the genus.

Corals (Moseley, Zool. pt. 7).

Solenosmilia variabilis, Duncan. Numerous specimens; obtained also at Stations 135 and 145.

Hydroida (Allman, Zool. pt. 70).

Cryptolaria crassicaulis, n.sp. Obtained at no other locality.

Crinoidea (Carpenter, Zool. pt. 60).

Antedon multispina, n.sp. Four specimens and three Pentacrinoid larvæ; obtained also at Station 135.

,, *porrecta*, n.sp. Four specimens; obtained at no other locality.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophiacantha cuspidata, n.sp. Several specimens; obtained at no other locality.

Ophiocreas œdipus, n.sp. Several specimens; obtained also at Stations 214 and 343.

Genus nov. (?), (young).

Echinoidea (Agassiz, Zool. pt. 9).

Salenia varispina, Agassiz. For distribution see Station 23.

Annelida (M'Intosh, Zool. pt. 34).

Eunice prognatha, n.sp. Two specimens; obtained at no other locality.

Ostracoda (Brady, Zool. pt. 3).

Macrocypris similis, n.sp. Obtained also at Stations 120 and 305.

Cythere speyeri, Brady. Obtained also at Station 93.

Cytherella pulchra, Brady (?). Obtained also at Stations 33, 167, and Port Jackson.

Cirripedia (Hoek, Zool. pt. 25).

Pœcilasma carinatum, n.sp. Five specimens; obtained also at Station 24.

Lamellibranchiata (Smith, Zool. pt. 35).

Cryptodon sp. (?). Single valve.

Leda jeffreysi, Hidalgo. Several specimens; obtained also at Station 78.

Scaphopoda and Gasteropoda (Watson, Zool. pt. 42). Station 344.

Dentalium entalis, Linné, var. *agile*, Sars. For distribution of the species see Station II.

Basilissa oxytropis, n.g., n.sp. Two specimens ; obtained at no other locality.

Sigaretus sp. (?).

Capulus sp. (?).

Odostomia sp. (?).

Eulima chyta, n.sp. Obtained at no other locality.

Bittium sp. (?).

Rissoa (*Setia*) *tenuisculpta*, Watson. Obtained also at Station 24.

„ („) *triangularis*, n.sp. Obtained at no other locality.

Utriculus oryctus, n.sp. Obtained at no other locality.

Cylichna cylindracea (Pennant). Two specimens ; obtained also at Station 135.

Brachiopoda (Davidson, Zool. pt. 1).

Terebratula cubensis, Pourtalès. Two specimens ; obtained at no other locality by the Challenger. Recorded from Florida Reefs and Havana.

Terebratulina caput-serpentis, Linné, or *cailleti*, Crosse.

In addition to the foregoing, the following are recorded in the Station-book :—Many specimens, mostly dead, of *Aphrocallistes bocagei*, several Actinians on the Corals, *Primnoa*, *Mopsea*, and several other forms of Gorgonoids (only two species given above), Sertularian, *Stylaster erubescens*, *Echinus flemingii*, *Myzostoma* on *Antedon*, many *Serpulæ*, two specimens of *Scalpellum*, *Arcturus* (?), *Gnathophausia zoëa*, and several specimens of *Galathea*.

Excluding Protozoa, about 200 specimens of invertebrates were obtained at this Station, belonging to about 45 species, of which 15 are new to science, including representatives of 3 new genera ; 11 of the new species and 2 new genera were not obtained elsewhere.

Surface Organisms.—The following species is recorded from the surface at this Station :— Organisms from Surface-Nets.

Copepoda (Brady, Zool. pt. 23).

Pontella inermis, n.sp.

The tow-nets at the surface yielded, among other organisms, many *Globigerinæ*, Aphroditacean larvæ, larval Planarians, Copepods, Zoëæ, while the tow-net at the weights brought up a few Challengeridæ and other Radiolaria.

Station 345. **Station 345** (Sounding 495), Ascension Island to St. Vincent (see Chart 12 and Diagram 7).

April 4, 1876; lat. 5° 45′ S., long. 14° 25′ W.
Temperature of air at noon, 81°·8; mean for the day, 81°·6.
Temperature of water :—

	°		°
Surface,	82·8	190 fathoms,	47·3
10 fathoms,	82·8	200 „	46·9
20 „	82·0	225 „	45·9
30 „	79·6	250 „	45·0
40 „	76·3	275 „	44·3
50 „	71·6	300 „	43·8
60 „	65·0	400 „	42·0
70 „	59·8	500 „	40·6
80 „	56·5	600 „	39·7
90 „	54·4	700 „	39·1
100 „	52·8	800 „	38·8
110 „	51·8	900 „	38·6
120 „	51·0	1000 „	38·4
130 „	50·2	1100 „	38·2
140 „	49·7	1200 „	38·0
150 „	49·2	1300 „	37·8
160 „	48·8	1400 „	37·7
170 „	48·3	1500 „	37·6
180 „	47·8	Bottom,	36·8

Density at 60° F. :—

Surface,	1·02627	300 fathoms,	1·02564
25 fathoms,	1·02659	400 „	1·02567
50 „	1·02675	1525 „	1·02577
100 „	1·02596	Bottom,	1·02599
200 „	1·02575		

Depth, 2010 fathoms; deposit, Globigerina Ooze, containing 93·90 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 2 P.M. shortened and furled sails, and proceeded under steam to sound. At 3 P.M. sounded in 2010 fathoms; the sounding-tube brought up about half a quart of ooze uniform in colour throughout. Took serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 25 fathoms, and amounted to 34·3 milligrammes per litre. At 5.25 P.M. completed observations, and at 5.45 P.M. made sail.

Cape Verde distant at noon, 1260 miles. Made good 115 miles. Amount of current 11 miles, direction S. 38° W.

Surface Organisms.—The following species are recorded from the surface at this Station :— STATION 345. ORGANISMS FROM SURFACE-NETS.

COPEPODA (Brady, Zool. pt. 23).

Saphirina metallina, Dana.

PTEROPODA (Pelseneer, Zool. pt. 65).

Cavolinia longirostris (Lesueur).

The tow-nets yielded abundance of Foraminifera (*Globigerina*, *Orbulina*, *Pullenia*, *Sphæroidina*, and *Pulvinulina menardii*), including some very large specimens; many were surrounded by sarcode in which were entangled small Acanthometræ, Diatoms, and *Peridinium*. There were besides one or two Rhabdospheres, very many Oscillatoriaceæ, *Pyrocystis*, *Ethmodiscus* and other Diatoms, a few Radiolaria, Medusæ, small Planarians, Copepods, Hyperids, *Euphausia*, many small Decapod larvæ, and *Appendicularia*.

Station 346 (Sounding 496), Ascension Island to St. Vincent (see Chart 12 and Diagram 7). STATION 346.

April 6, 1876 ; lat. 2° 42′ S., long. 14° 41′ W.
Temperature of air at noon, 82°·3 ; mean for the day, 80°·5.
Temperature of water :—

Surface,	82·7	190 fathoms,	49·3
10 fathoms,	82·0	200 „	48·7
20 „	78·1	225 „	47·4
25 „	71·5	250 „	45·9
30 „	62·2	275 „	44·5
40 „	57·5	300 „	43·3
50 „	56·5	400 „	40·8
60 „	56·3	500 „	40·0
70 „	56·1	600 „	39·7
80 „	55·9	700 „	39·5
90 „	55·7	800 „	39·2
100 „	55·3	900 „	38·9
110 „	54·7	1000 „	38·7
120 „	54·0	1100 „	38·5
130 „	53·4	1200 „	38·2
140 „	52·6	1300 „	37·9
150 „	52·0	1400 „	37·7
160 „	51·3	1500 „	37·5
170 „	50·6	Bottom,	34·0
180 „	49·9		

Station 346.

Density at 60° F. :—

Surface,	1·02624	300 fathoms,	1·02570
25 fathoms,	1·02633	400 „	1·02556
50 „	1·02614	800 „	1·02594
100 „	1·02618	1875 „	1·02591
200 „	1 02602	Bottom,	1·02622

Depth, 2350 fathoms; deposit, Globigerina Ooze, containing 85·42 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5.40 A.M. shortened sail. At 6 A.M. stopped and sounded 2350 fathoms; the sounding-tube had sunk about a foot into the ooze, but with the exception of a few streaks on the outside it brought up no deposit. At 8 A.M. put dredge over and veered 2900 fathoms. At 9.30 A.M. took serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 800 and 1875 fathoms, and amounted respectively to 45·5 and 39·2 milligrammes per litre. At 1 P.M. commenced heaving in dredge, which came up at 3.45 P.M., with the swabs foul of the mouth of the dredge, but with several specimens attached to the swabs. In the dredge and attached tow-nets were about five litres of the deposit. Proceeded under steam and sail. A bird, probably a frigate bird, was seen while dredging.

Cape Verde distant at noon, 1062 miles. Made good 88 miles. Amount of current 29 miles, direction S. 72° W.

Animals from Dredge.

The following species are recorded in the Zoological Reports from the dredge at this Station :—

Asteroidea (Sladen, Zool. pt. 51).

Styracaster horridus, n.g., n.sp. Three specimens; obtained at no other locality. Recorded subsequently from Indian Ocean ("Investigator").

Freyella tuberculata, n.sp. Two specimens; obtained also at Station 89.

Ophiuroidea (Lyman, Zool. pt. 14).

Ophioglypha convexa, n.sp. Four specimens; obtained also at Stations 241 and 246.

Holothurioidea (Théel, Zool. pt. 39).

Synapta abyssicola, n.sp. (?). Small fragment; obtained at no other locality.

Ostracoda (Brady, Zool. pt. 3).

Cythere dasyderma, n.sp. For distribution see Station 5.

The Station-book records also a Polyzoon.

Excluding Protozoa, over a dozen specimens of invertebrates were obtained at this Station, belonging to 6 species, of which 5 (all those reported) are new to science, including representative of 1 new genus; 2 of the new species were not obtained elsewhere. STATION 346.

FORAMINIFERA (Brady, Zool. pt. 22).—The following species of Foraminifera were observed in the deposit from this Station; the pelagic species, which make up about 88 per cent. of the carbonate of lime present in the deposit, are marked thus ×:— ORGANISMS FROM THE DEPOSIT.

Biloculina depressa, d'Orbigny.
„ *sphæra*, d'Orbigny.
Miliolina insignis, Brady.
„ *seminulum* (Linné).
„ *venusta* (Karrer).
Reophax nodulosa, Brady.
„ *pilulifera*, Brady.
Haplophragmium globigeriniforme (Parker and Jones).
„ *glomeratum*, Brady.
„ *nanum*, Brady.
„ *turbinatum*, Brady.
Thurammina papillata, Brady.
Hormosina globulifera, Brady.
Ammodiscus charoides (Jones and Parker).
„ *incertus* (d'Orbigny).
Trochammina galeata, Brady.
„ *ringens*, Brady.
„ *trullissata*, Brady.
Textularia agglutinans, d'Orbigny, var. *porrecta*, Brady.
Verneuilina pygmæa (Egger).
Gaudryina pupoides, d'Orbigny.
„ *siphonella*, Reuss.
Bulimina pyrula, d'Orbigny.
Virgulina schreibersiana, Czjzek.
„ *subdepressa*, Brady.
„ *texturata*, Brady.
Pleurostomella subnodosa, Reuss.
Cassidulina crassa, d'Orbigny.
Ehrenbergina serrata, Reuss.
Chilostomella ovoidea, Reuss.
Lagena acuta (Reuss).
„ *auriculata*, Brady.
„ *desmophora*, Rymer Jones.
„ *globosa* (Montagu).
„ *gracilis*, Williamson.
„ *lævigata* (Reuss).
„ *lævis* (Montagu).
„ *marginata* (Walker and Boys).
Lagena multicosta (Karrer).
„ *orbignyana* (Seguenza).
„ *semimarginata*, Reuss.
„ *seminiformis*, Schwager.
„ *seminuda*, Brady.
„ *siliqua*, Rymer Jones.
„ *staphyllearia* (Schwager).
„ *stelligera*, Brady.
„ *striata* (d'Orbigny).
„ *sulcata* (Walker and Jacob).
Nodosaria communis, d'Orbigny.
„ *mucronata*, Neugeboren.
„ *radicula* (Linné).
Marginulina costata (Batsch).
„ *glabra*, d'Orbigny.
Vaginulina legumen (Linné).
Cristellaria convergens, Bornemann.
„ *crepidula* (Fichtel and Moll).
„ *tenuis*, Bornemann.
Polymorphina angusta, Egger.
„ *lanceolata*, Reuss.
Uvigerina asperula, Czjzek.
× *Globigerina bulloides*, d'Orbigny.
× „ *conglobata*, Brady.
× „ *cretacea*, d'Orbigny (?).
× „ *inflata*, d'Orbigny.
× „ *rubra*, d'Orbigny.
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Pullenia obliquiloculata*, Parker and Jones.
„ *quinqueloba*, Reuss.
„ *sphæroides* (d'Orbigny).
Sphæroidina bulloides, d'Orbigny.
× „ *dehiscens*, Parker and Jones.
Truncatulina wuellerstorfi (Schwager).
× *Pulvinulina canariensis* (d'Orbigny).
× „ *crassa* (d'Orbigny).
× „ *menardii* (d'Orbigny).
× „ „ var. *fimbriata*, Brady.
× „ *micheliniana* (d'Orbigny).

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× *Pulvinulina patagonica* (d'Orbigny).
,, *pauperata*, Parker and Jones.
× ,, *tumida*, Brady.
Rotalia soldanii, d'Orbigny.
Nonionina umbilicatula (Montagu).
Polystomella striatopunctata (Fichtel and Moll).

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Siphonosphæra socialis, Haeckel.
Artiscus hystrix, Haeckel.
Xiphacantha ciliata, Haeckel.
Lychnaspis giltschii, Haeckel.
Icosaspis elegans, Haeckel.
Gorgonetta mirabilis, Haeckel.
Castanidium buchanani, Haeckel.
,, *moseleyi*, Haeckel.
Castanura tizardi, Haeckel.
Conchidium argiope, Haeckel.
Cælodendrum spinosissimum, Haeckel.

Siphonophoræ (Haeckel, Zool. pt. 77).

Velella scaphidia, Péron and Lesueur.
Armenista sigmoides, n.g., n.sp.
Aglaisma gegenbauri, n.sp.
Calpe gegenbauri, n.sp.

Amphipoda (Stebbing, Zool. pt. 67).

Phronimella elongata, Claus.

Schizopoda (Sars, Zool. pt. 37).

Thysanopoda tricuspidata, M.-Edwards.
Nematoscelis rostrata, n.g., n.sp.

Tunicata (Herdman, Zool. pt. 76).

Salpa democratica - mucronata, Forskål.

The tow-nets procured Oscillatoriaceæ in great abundance, *Pyrocystis*, Diatoms, *Peridinium*, a few Coccospheres and Rhabdospheres, *Globigerina*, *Orbulina*, *Pullenia*, *Sphæroidina*, *Pulvinulina*, Medusæ, Siphonophoræ, *Sagitta*, *Alciopa*, *Tomopteris*, Aphroditacean larvæ, Copepods, Hyperids, Decapods and larvæ, *Atlanta* and other Heteropods, various species of Pteropods, *Appendicularia*, *Doliolum*, and small fishes. A tow-net sent down to 200 fathoms yielded Challengeridæ and other deep-sea Radiolaria.

Station 347.

Station 347 (Sounding 497), Ascension Island to St. Vincent (see Chart 12 and Diagram 7).

April 7, 1876 ; lat. 0° 15′ S., long. 14° 25′ W.
Temperature of air at noon, 81°·8 ; mean for the day, 81°·4.

Temperature of water :— STATION 347.

	°		°
Surface, ...	82·0	190 fathoms, . . .	49·5
10 fathoms, . . .	81.2	200 „ . . .	48·7
20 „ . . .	78·0	225 „ . . .	47·8
30 „ . . .	74·0	250 „ . . .	46·0
40 „ . . .	69·8	275 „ . . .	45·0
50 „ . . .	65·2	300 „ . . .	44·0
60 „ . . .	61·8	400 „ . . .	42·0
70 „ . . .	60·5	500 „ . .	41·4
80 „ . . .	59·7	600 „ . . .	41·0
90 „ . . .	58·8	700 „ . . .	40·6
100 „ . . .	58·0	800 „ . . .	40·3
110 „ . . .	57·2	900 „ . . .	40·0
120 „ . . .	56·3	1000 „ . . .	39·7
130 „ . . .	55·5	1100 „ . . .	39·3
140 „ . . .	54·6	1200 „ . . .	39·0
150 „ . . .	53·8	1300 „ . . .	38·7
160 „ . . .	53·0	1400 „ . . .	38·3
170 „ . . .	52·1	1500 „ . . .	38·0
180 „ . . .	50·3	Bottom, . . .	36·2

Density at 60° F. :—

Surface, . . .	1·02639	300 fathoms, . .	1·02565
25 fathoms, . .	1·02664	1500 „ . .	1·02595
50 „ . .	1·02690	Bottom, . .	1·02589
100 „ . .	1·02609		

Depth, 2250 fathoms; deposit, Globigerina Ooze, containing 84·48 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 3.20 P.M. stopped, and at 3.30 P.M. sounded in 2250 fathoms. Obtained serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 300 fathoms, and amounted to 45·5 milligrammes per litre. At 6.40 P.M. completed observations and proceeded under steam and sail. One or two Thalassidromas were seen.

Cape Verde distant at noon, 940 miles. Made good 125 miles. Amount of current 24 miles, direction S. 57° W.

RADIOLARIA (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station :— ORGANISMS FROM THE DEPOSIT.

Cenosphæra bombus, Haeckel.
„ *perforata*, Haeckel.
Xiphosphæra maxima, Haeckel.
Stylosphæra musa, Haeckel.
Ellipsidium echinidium, Haeckel.
Lithomespilus flammabundus, Haeckel.
Hymeniastrum pythagoræ, Ehrenberg.
Pentophiastrum dicranastrum, Haeckel.
Octopyle staurostyle, Haeckel.
Archicircus ovalis, Haeckel.
Semantrum sphragisma, Haeckel.
Podocoronis tetrapodiscus, Haeckel.

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Tricyclidium dictyospiris, Haeckel.
Tympaniscus dodecaster, Haeckel.
Tympanidium staurocircum, Haeckel.
Distympanium distephanus, Haeckel.
Tripospyris semantidium, Haeckel.
Tristylospyris palmipes, Haeckel.
Dendrospyris arborescens, Haeckel.
Tessarospyris nuciformis, Haeckel.
Zygospyris equus, Haeckel.
Taurospyris bovina, Haeckel.
Ceratospyris allmersii, Haeckel.
Circospyris nucula, Haeckel.
Patagospyris anthocyrtis, Haeckel.
Sphærospyris globosa, Haeckel.
Cannobotrys monocanna, Haeckel.
Acrobotrys pentasolenia, Haeckel.
Pylobotrys putealis, Haeckel.
Tridictyopus conulus, Haeckel.
Clavoscenium pinnatum, Haeckel.
Batluropyramis ramosa, Haeckel.
Phænocalpis petalospyris, Haeckel.
Cyrtocalpis reticulum, Haeckel.
Lithomelissa haeckelii, Bütschli.
Lychnocanium fortipes, Haeckel.
Anthocyrtium anemone, Haeckel.
„ *setosum*, Haeckel.
Sethoconus mitra, Haeckel.
„ *tabulatus*, Haeckel.
Pterocorys pipetta, Haeckel.
Theopodium tricostatum, Haeckel.
Rhopalocanium cortinium, Haeckel.
Phormocyrtis carinata, Haeckel.
Cycladophora lanterna, Haeckel.
Calocyclas sacerdotis, Haeckel.
Theoconus longicornis, Haeckel.
Theocampe nucula, Haeckel.
Tricolocapsa schleidenii, Haeckel.
Eucyrtidium galatheæ, Ehrenberg.
Eusyringium leptosiphon, Haeckel.
Cyrtocapsa diploconus, Haeckel.
Phæodina cannopylea, Haeckel.
Catinulus lopadium, Haeckel.
Mesocena annulus, Haeckel.
Anographis gemmascens, Haeckel.
„ *polyancistra*, Haeckel.
Orosphæra confluens, Haeckel.
Oroplegma giganteum, Haeckel.
Aulastrum monoceros, Haeckel.
Cannosphæra atlantica, Haeckel.
Lithogromia diatomacea, Haeckel.
Challengeria sloggettii, Murray.
„ *wildi*, Haeckel.
Challengeron heptacanthum, Haeckel.
„ *carpenterii*, Murray.
„ *wyvillei*, Haeckel.
Pharyngella invaginata, Haeckel.
Porcupinia aculeata, Haeckel.
Medusetta codonium, Haeckel.
Euphysetta hybocodon, Haeckel.
Gazelletta schleinitzii, Haeckel.
Circogonia icosahedra, Haeckel.
Haeckeliana maxima, Haeckel.
Cœlodasea spongiosa, Haeckel.
Cœlodecas sagittaria, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Actissa phacoides, Haeckel.
Collozoum contortum, Haeckel.
Thalassosphæra rhaphidium, Haeckel.
Siphonosphæra socialis, Haeckel.
Coronosphæra concolvulus, Haeckel.
Hexastylus longissimus, Haeckel.
Hexacontium sceptrum, Haeckel.
Acanthosphæra insignis, Haeckel.
Heliosphæra heteracantha, Haeckel.
Haliomma hexagonium, Haeckel.
Astrosphæra splendens, Haeckel.
Arachnosphæra polaris, Haeckel.
Spongopila dichotoma, Haeckel.
Cenellipsis maxima, Haeckel.
Stylartus penicillus, Haeckel.
Cyphonium ethmarium, Haeckel.
Amphibrachium capitatum, Haeckel.
Dictyastrum hexagonum, Haeckel.
„ *trispinosum*, Haeckel.
Histiastrum quadrigatum, Haeckel.
Pylolena inermis, Haeckel.
Spongostaurus hastatus, Haeckel.
Pylonium stenozonium, Haeckel.
Acanthonia claparedei, Haeckel.

Xiphacantha ciliata, Haeckel.
Dorataspis polypora, Haeckel.
Zonaspis æquatorialis, Haeckel.
Tessaraspis arachnoides, Haeckel.
Lychnaspis giltschii, Haeckel.
Icosaspis elegans, Haeckel.
Phractopelta aspidomma, Haeckel.
Belonaspis multiforis, Haeckel.
Diploconus cotyliscus, Haeckel.
Plagonium sphærozoum, Haeckel.
Acanthodesmia mülleri, Haeckel.
Prismatium tripodium, Haeckel.
Litharachnium discoides, Haeckel.
Carpocanistrum flosculum, Haeckel.
Dictyophimus challengeri, Haeckel.
Lithomelissa decacantha, Haeckel.
Lithopera ananassa, Haeckel.
Arachnocorys circumtexta, Haeckel.
Carpocanium hexagonale, Haeckel.
Theopilium triradiatum, Haeckel.
Corocalyptra elisabethæ, Haeckel.
Dictyocodon prometheus, Haeckel.
Podocyrtis argus, Ehrenberg.
Cannobelos thalassoplancta, Haeckel.
Dictyocha staurodon, Ehrenberg.
Distephanus crux, Haeckel.
Sagmarium plegmosphærium, Haeckel.
Aulosphæra coronata, Haeckel.
Auloscena pyramidalis, Haeckel.
Aulonia hexagonia, Haeckel.
Gorgonetta mirabilis, Haeckel.
Castanella sloggetti, Haeckel.
Castanidium buchanani, Haeckel.
„ *moseleyi*, Haeckel.
Castanissa challengeri, Haeckel.
Castanopsis naresi, Haeckel.
Conchidium argiope, Haeckel.
Cœlodendrum spinosissimum, Haeckel.

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Amphipoda (Stebbing, Zool. pt. 67).

Anchylomera sp. (?).
Oxycephalus clausi, Bovallius.
Rhabdosoma armatum (M.-Edwards).

Macrura (Spence Bate, Zool. pt. 52).

Sergestes diapontius, n.sp.

In addition, the following are recorded in the note-books :—Oscillatoriaceæ abundant, *Peridinium*, *Pyrocystis*, various Diatoms, some with *Vorticella* attached, *Globigerina*, *Orbulina*, *Hastigerina*, *Pullenia*, *Sphæroidina*, *Pulvinulina*, Medusæ, Siphonophoræ, *Sagitta*, Aphroditacean larvæ, *Copilia* and other Copepods abundant, Cypris stages of Cirripeds, Decapod larvæ, larval Lamellibranchs (mussels ?), pelagic Gasteropod with spiral shell, Pteropods and larvæ, *Doliolum*, and *Appendicularia*.

The following species are recorded from the surface of the South Atlantic and tropical Atlantic, the exact locality not being noted :—

Macrura (Spence Bate, Zool. pt. 52).

Peteinura gubernata, n.g., n.sp.
Sergestes longirostris, n.sp.
Lucifer typus, Thompson.
„ *reynaudii*, M.-Edwards.

Isopoda.

Five specimens, genera and species undetermined.

Tunicata (Herdman, Zool. pt. 76).

Pyrosoma sp. (?).

Station 348.

Station 348 (Sounding 498), Ascension Island to St. Vincent (see Chart 12).

April 9, 1876 ; lat. 3° 10′ N., long. 14° 51′ W.
Temperature of air at noon, 84°·8 ; mean for the day, 82°·1.
Temperature of water :—

	°		°
Surface,	84·0	190 fathoms,	49·7
10 fathoms,	84·0	200 „	49·1
20 „	82·2	225 „	47·8
30 „	70·8	250 „	46·4
40 „	62·2	275 „	45·1
50 „	59·5	300 „	43·8
60 „	58·2	400 „	41·2
70 „	57·6	500 „	40·4
80 „	57·0	600 „	40·0
90 „	56·5	700 „	39·8
100 „	56·1	800 „	39·6
110 „	55·7	900 „	39·3
120 „	55·3	1000 „	39·0
130 „	54·9	1100 „	38·7
140 „	54·5	1200 „	38·4
150 „	54·1	1300 „	38·1
160 „	53·0	1400 „	37·8
170 „	52·0	1500 „	37·6
180 „	50·9		

Density at 60° F. :—

Surface,	1·02578	200 fathoms,	1·02589
25 fathoms,	1·02599	300 „	1·02602
50 „	1·02629	385 „	1·02580
100 „	1·02627	800 „	1·02565

Depth (2450 fathoms) ; deposit, Globigerina Ooze, containing 83·13 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 5.40 A.M. stopped to dredge and obtain temperatures in the same position as Station 102 of August 21, 1873, about 430 miles W.S.W. of Cape Palmas. At 6 A.M. put over dredge, veering 3000 fathoms. Took serial temperatures down to 1500 fathoms. At 11 A.M. commenced heaving in dredge, which came up at 2 P.M. with very few specimens, but the dredge and attached tow-net contained over eleven litres of the deposit. At 2.10 P.M. proceeded under steam. One Thalassidroma was seen.

Cape Verde distant at noon, 714 miles. Made good 110 miles. Amount of current 6 miles, direction N. 39° W.

The following species are recorded in the Zoological Reports from the dredge at this Station :— Station 348. Animals from Dredge.

Hexactinellida (Schulze, Zool. pt. 53).

Malacosaccus unguiculatus, n.g., n.sp. One specimen ; obtained at no other locality.

Lamellibranchiata (Smith, Zool. pt. 35).

Callocardia (?) *adamsii*, n.sp. Obtained at no other locality.

Fishes (Günther, Zool. pt. 57).

Melanocetus murrayi, n.sp. One specimen ; obtained also at Station 106.

The Station-book records also a fragment of Hexactinellid Sponge (possibly of a large *Euplectella*).

The following species of Foraminifera and Radiolaria were observed in the deposit from this Station (see also Murray and Renard, Deep-Sea Deposits Chall. Exp.) :— Organisms from the Deposit.

Foraminifera (Brady, Zool. pt. 22).—The pelagic species, which make up about 88 per cent. of the carbonate of lime present in the deposit, are marked thus ×.

Biloculina depressa, d'Orbigny.
„ *ringens* (Lamarck).
Miliolina venusta (Karrer).
Saccammina sphærica, Sars (?).
Hyperammina ramosa, Brady.
„ *subnodosa*, Brady.
Aschemonella ramuliformis, Brady (?).
Rhizammina algæformis, Brady.
Reophax dentaliniformis, Brady.
„ *nodulosa*, Brady.
Haplophragmium agglutinans (d'Orbigny).
„ *anceps*, Brady.
„ *globigeriniforme* (Parker and Jones).
„ *latidorsatum* (Bornemann).
„ *nanum*, Brady.
„ *rotulatum*, Brady.
„ *turbinatum*, Brady.
Thurammina papillata, Brady.
Hormosina globulifera, Brady.
Trochammina galeata, Brady.
„ *pauciloculata*, Brady.
„ *ringens*, Brady.
„ *trullissata*, Brady.
Webbina clavata, Jones and Parker.
Textularia agglutinans, d'Orbigny.
Verneuilina pygmæa (Egger).
Spiroplecta biformis (Parker and Jones).
Pleurostomella subnodosa, Reuss.
Lagena desmophora, Rymer Jones.
„ *exsculpta*, Brady.
„ *formosa*, Schwager.
„ *marginata* (Walker and Boys).
„ *orbignyana* (Seguenza).
„ *seminuda*, Brady.
Nodosaria communis, d'Orbigny.
× *Globigerina æquilateralis*, Brady.
× „ *bulloides*, d'Orbigny.
× „ „ var. *triloba*, Reuss.
× „ *conglobata*, Brady.
× „ *dubia*, Egger.
× „ *helicina*, d'Orbigny.
× „ *rubra*, d'Orbigny (?).
× „ *sacculifera*, Brady.
× *Orbulina universa*, d'Orbigny.
× *Pullenia obliquiloculata*, Parker and Jones.
„ *quinqueloba*, Reuss (?).
× *Sphæroidina dehiscens*, Parker and Jones.
Truncatulina pygmæa, Hantken.
„ *tenera*, Brady (?).

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Truncatulina ungeriana (d'Orbigny).
„ *wuellerstorfi* (Schwager).
Anomalina sp. (?).
× *Pulvinulina crassa* (d'Orbigny).
„ *exigua*, Brady.
× *Pulvinulina menardii* (d'Orbigny).
× „ *micheliniana* (d'Orbigny).
× „ *tumida*, Brady.
Rotalia soldanii, d'Orbigny.
Nonionina umbilicatula (Montagu).

Radiolaria (Haeckel, Zool. pt. 40).

Siphonosphæra patinaria, Haeckel.
Hexalonche farosa, Haeckel.
Acanthosphæra maxima, Haeckel.
Haliomma grande, Haeckel.
Actinomma dodecomma, Haeckel.
Spongatractus pachystylus, Haeckel
Spongolira persicina, Haeckel.
Cannartus biscottus, Haeckel.
Panartus tetracolus, Haeckel.
Sethostylus spicatus, Haeckel.
Stylocyclia dimidiata, Ehrenberg.
Astrocyclia heterocycla, Haeckel.
Astractura ordinata, Haeckel.
Stauralastrum staurolonche, Haeckel.
Tetrapyle cardiopyle, Haeckel.
Spirema subglobosum, Haeckel.
Phractaspis constricta, Haeckel.
Triplecta triangulum, Haeckel.
Semantidium sexangulum, Haeckel.
Clathrocircus octoporus, Haeckel.
Cortiniscus tripylaris, Haeckel.
Coronidium acacia, Haeckel.
Tricyclidium semantrum, Haeckel.
Acrocubus tesseralis, Haeckel.
Toxarium cordatum, Haeckel.
Tripospyris tessaromma, Haeckel.
Triceraspyris longicornis, Haeckel.
Dipospyris sigmopodium, Haeckel.
Tripilidium costatum, Haeckel.
Tripodiscium clavatum, Haeckel.
Euscenium furcatum, Haeckel.
Sethoplormis astrodiscus, Haeckel.
Sethamphora serrata, Haeckel.
Sethopyramis cyclomma, Haeckel.
Acanthocorys enneapodia, Haeckel.
Carpocanium læve, Ehrenberg.
Lophophæna galea, Ehrenberg.
Dictyoceras melitta, Haeckel.
Podocyrtis princeps, Ehrenberg.
Lithochytris pyriformis, Haeckel.
Clathrocyclas basilea, Haeckel.
Tricolocampe amphizona, Haeckel.
„ *cingulata*, Haeckel.
Theocorys tuberculata, Haeckel.
Lithostrobus cuspidatus, Haeckel.
Artostrobus biseriatus, Haeckel.
Lithocampe eupora, Haeckel.
Distephanus octonarius, Haeckel.
Oroscena darwinii, Haeckel.
Aulastrum monoceros, Haeckel.
Cannosphæra atlantica, Haeckel.
Challengeria sloggettii, Murray.
„ *wildi*, Haeckel.
Challengeron heptacanthum, Haeckel.
„ *buchanani*, Haeckel.
„ *carpenterii*, Murray.
Pharyngella monoceros, Haeckel.
Euphysetta staurocodon, Haeckel.
Castanarium lubbocki, Haeckel.
Circoporus sexfuscinus, Haeckel.
Circogonia dodecacantha, Haeckel.
Tuscarora tetrahedra, Murray.
Conocharium diatomeum, Haeckel.
Conchoceras caudatum, Haeckel.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface and deep tow-nets at this Station :—

Radiolaria (Haeckel, Zool. pt. 40).

Actissa prototypus, Haeckel.
Belonozoum atlanticum, Haeckel.
Collosphæra polygona, Haeckel.
„ *pyriformis*, Haeckel (?).
Collosphæra irregularis, Haeckel.
Siphonosphæra cyathina, Haeckel.
„ *socialis*, Haeckel.
Elaphococcus furcatus, Haeckel.

Rhizosphæra leptomita, Haeckel.
Trizonium amphibelonium, Haeckel.
Tetrapyle pluteus, Haeckel.
Staurotholus dodecastylus, Haeckel.
Lithelius spiralis, Haeckel.
Acanthonia mülleri, Haeckel.
,, *multispina*, Haeckel.
Xiphacantha quadridentata, Haeckel.
,, *ciliata*, Haeckel.
Acanthostaurus purpurascens, Haeckel.
Lithoptera tetraptera, Haeckel.
Lychnaspis giltschii, Haeckel.
Icosaspis elegans, Haeckel.
Octopelta scutella, Haeckel.
Phatnaspis ensiformis, Haeckel.
exonaspis heliosestrum, Haeckel. STATION 348.
Semantis distephanus, Haeckel.
Lithomelissa bicornis, Ehrenberg.
Lithopera ananassa, Haeckel.
Arachnocorys circumtexta, Haeckel.
Auloscena pyramidalis, Haeckel.
Aulatractus fusiformis, Haeckel.
Aulonia hexagonia, Haeckel.
Gorgonetta mirabilis, Haeckel.
Castanella sloggetti, Haeckel.
Castanidium buchanani, Haeckel.
,, *moseleyi*, Haeckel.
Castanopsis naresi, Haeckel.
Conchidium argiope, Haeckel.
Cœlodendrum spinosissimum, Haeckel.

DEEP-SEA MEDUSÆ (Haeckel, Zool. pt. 12).

Charybdea murrayana, n.sp.

SIPHONOPHORÆ (Haeckel, Zool. pt. 77).

Rataria cristata, n.sp.
Cucubalus pyramidalis, Haeckel.
Amphiroa carina, n.sp.
Ersæa compressa, n.sp.
Cymba crystallus, n.sp.
Diphyopsis compressa, n.g., n.sp.
Abyla carina, n.sp.

OSTRACODA (Brady, Zool. pt. 3).

Halocypris atlantica, Lubbock.

COPEPODA (Brady, Zool. pt. 23).

Calanus valgus, n.sp.
,, *propinquus*, n.sp.
,, *gracilis*, Dana.
Eucalanus attenuatus (Dana).
Heterochæta spinifrons, Claus.
Undina vulgaris, Dana.
Scolecithrix danæ (Lubbock).
Euchæta prestandreæ, Philippi.
Candace pectinata, Brady.
,, *pachydactyla*, Dana.
Ætidius armatus, n.g., n.sp.
Temora dubia (Lubbock).
Oithona challengerii, n.sp.
Ectinosoma atlanticum (Brady and Robertson).
Setella gracilis, Dana.
Corycæus varius, Dana.
,, *venustus*, Dana.
Oncæa obtusa (Dana).
Saphirina metallina, Dana.

AMPHIPODA (Stebbing, Zool. pt. 67).

Phronimella elongata, Claus.
Anchylomera sp. (?).
Platyscelus serratulus, n.n.

SCHIZOPODA (Sars, Zool. pt. 37).

Nematoscelis tenella, n.g., n.sp.
,, *rostrata*, n.g., n.sp.
Stylocheiron abbreviatum, n.g., n.sp.

PTEROPODA (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *virgula* (Rang).

FISHES (Günther, Zool. pt. 78).

Carcharias obscurus, Les.
Echeneis remora, Linné (from shark).

Station 348. The tow-nets at the surface and down to 200 fathoms yielded an abundant harvest, including:—Many Oscillatoriaceæ, *Peridinium*, *Pyrocystis*, Diatoms, *Globigerina*, *Orbulina*, *Hastigerina*, *Pullenia*, *Sphæroidina*, *Pulvinulina*, Acanthometræ, Polycystinæ, Challengeridæ, and compound Radiolaria, Medusæ, Siphonophoræ, Echinoderm larvæ (Bipinnaria), *Sagitta*, *Alciopa*, *Tomopteris*, *Distomum* parasitic on *Sagitta*, *Cypridina*, various Copepods, Hyperids, *Rhabdosoma*, *Lucifer*, Gasteropod shells, *Atlanta*, *Acura pelagica*, various Pteropods, larvæ of *Cymbulia* (?) and *Pleuropus* [= *Cavolinia*], *Appendicularia*, *Doliolum*, and larval fishes. The sarcode of a large number of *Sphæroidinæ* was carefully examined, and frequently there were observed in the interior of the shells two large cells, some of them with a coarse granular appearance and others very much more minutely granular, but no conclusion was arrived at concerning their function or origin. Several sharks were about the ship, with suckers and pilot fishes, and two were caught.

Station 349. **Station 349** (Sounding 499), Ascension Island to St. Vincent (see Chart 12).

April 10, 1876; lat. 5° 28′ N., long. 14° 38′ W.

Temperature of air at noon, 80°·3; mean for the day, 81°·9.

Temperature of water:—

Surface,	83°·5	110 fathoms,	55°·2
10 fathoms,	82·2	120 „	54·6
20 „	70·0	130 „	54·0
30 „	62·6	140 „	53·3
40 „	60·2	150 „	52·4
50 „	59·2	160 „	52·1
60 „	58·5	170 „	51·4
70 „	57·8	180 „	50·8
80 „	57·1	190 „	50·1
90 „	56·5	200 „	49·5
100 „	55·9		

Density at 60° F.:—

Surface,	1·02616	100 fathoms,	1·02620
25 fathoms,	1·02630	200 „	1·02599
50 „	1·02624	300 „	1·02583

At 6 A.M. a waterspout began to form about 8 miles to the S.W. and continued, varying in size, until 7.20 A.M. when it gradually disappeared; it was only joined for a few minutes. At 1.25 P.M. stopped and took serial temperatures down to 200 fathoms, about 25 miles to the S.E. of Station 101, August 19, 1873. At 2.50 P.M. proceeded.

Cape Verde distant at noon, 588 miles. Made good 130 miles.

Surface Organisms.—The following species are recorded from the surface at this Station :— Station 349. Organisms from Surface-Nets.

Radiolaria (Haeckel, Zool. pt. 40).

Collozoum vermiforme, Haeckel.
Spongodictyon arcadophoron, Haeckel.
Collosphæra polygona, Haeckel.
Siphonosphæra cyathina, Haeckel.
„ *socialis*, Haeckel.
Haliomma tenellum, Haeckel.
Spongodrymus elaphococcus, Haeckel.
Rhizosphæra leptomita, Haeckel.
Tetrapyle pluteus, Haeckel.
Lithelius spiralis, Haeckel.
Acanthonia mülleri, Haeckel.
Xiphacantha quadridentata, Haeckel.
„ *ciliata*, Haeckel.
Acanthostaurus purpurascens, Haeckel.
Ceriaspis icosahedra, Haeckel.
Coscinaspis polypora, Haeckel.
Icosaspis elegans, Haeckel.
Dictyospyris anthophora, Haeckel.
Lithomelissa bicornis, Ehrenberg.
Lithopera ananassa, Haeckel.
Arachnocorys circumtexta, Haeckel.
Auloscena pyramidalis, Haeckel.
Aulatractus fusiformis, Haeckel.
Aulonia hexagonia, Haeckel.
Challengeria xiphodon, Haeckel.
Castanella sloggetti, Haeckel.
Castanidium buchanani, Haeckel.
„ *moseleyi*, Haeckel.
Castanopsis naresi, Haeckel.
Conchidium argiope, Haeckel.
Cœlodendrum spinosissimum, Haeckel.

Siphonophoræ (Haeckel, Zool. pt. 77).

Ersæa compressa, n.sp.

Copepoda (Brady, Zool. pt. 23).

Calanus gracilis, Dana.
Eucalanus attenuatus (Dana).
Rhincalanus cornutus, Dana.
Pleuromma abdominale (Lubbock).
Undina vulgaris, Dana.
Scolecithrix danæ (Lubbock).
Euchæta prestandreæ, Philippi.
Candace pectinata, Brady.
Drepanopus furcatus, n.g., n.sp.
Temora dubia (Lubbock).
Oithona challengerii, n.sp.
Miracia efferata, Dana.
Corycæus varius, Dana.
Copilia mirabilis, Dana.
Lubbockia squillimana, Claus.
Oncæa obtusa (Dana).
Saphirina ovalis, Dana.
„ *inæqualis*, Dana.
Saphirinella stylifera (Lubbock).

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *acicula* (Rang).
Cavolinia longirostris (Lesueur).

The tow-nets again yielded an abundant harvest of the same character as at the previous Station, Echinoderm larvæ and Brachyurous Zoëæ (?) being very abundant.

Station 350 (Sounding 500), Ascension Island to St. Vincent (see Chart 12). Station 350.

April 11, 1876 ; lat. 7° 33′ N., long. 15° 16′ W.
Temperature of air at noon, 84°·3 ; mean for the day, 82°·5.

Station 350.

Temperature of water :—

Surface,	84·0°	110 fathoms,	56·3°
10 fathoms,	84·0	120 „	55·7
20 „	75·0	130 „	55·2
30 „	68·5	140 „	55·0
40 „	64·8	150 „	54·5
50 „	62·2	160 „	53·6
60 „	60·3	170 „	52·5
70 „	59·2	180 „	51·6
80 „	58·3	190 „	50·7
90 „	57·5	200 „	50·0
100 „	56·7	300 „	45·0

Density at 60° F. :—

Surface,	1·02615	100 fathoms,	1·02619
25 fathoms,	1·02627	110 „	1·02627
50 „	1·02627	130 „	1·02580

At 1.20 P.M. stopped and took serial temperatures down to 300 fathoms, about 40 miles to the E.N.E. of Station 100, August 16, 1873. The carbonic acid was determined in surface water, and amounted to 33·8 milligrammes per litre. At 3 P.M. proceeded.

Cape Verde distant at noon, 460 miles; Sierra Leone, about 140 miles E.N.E. Made good 129 miles. Amount of current 8 miles, direction N. 62° E.

Organisms from Surface-Nets.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Copepoda (Brady, Zool. pt. 23).

Eucalanus attenuatus (Dana).
„ *setiger*, n.sp.
Heterochæta spinifrons, Claus.
Lœuckartia flavicornis, Claus.
Undina vulgaris, Dana.
Scolecithrix danæ (Lubbock).
Euchæta prestandreæ, Philippi.
Candace pectinata, Brady.
Acartia laxa, Dana.
Temora dubia (Lubbock).
Oithona challengerii, n.sp.
Miracia efferata, Dana.
Corycæus varius, Dana.
Oncæa obtusa, Dana.
Saphirina inæqualis, Dana.

Pteropoda (Pelseneer, Zool. pt. 65).

Cavolinia inflexa (Lesueur), (young = *Hyalæa depressa*, d'Orbigny).

Tunicata (Herdman, Zool. pt. 76).

Doliolum denticulatum, Quoy and Gaimard.

Doliolum sp., (blastozooid).
Salpa democratica - mucronata, Forskål.

Fishes (Günther, Zool. pt. 78).
Trigla macrodactylus, n.sp.
Young Pleuronectids.

Station 350.

The tow-net procured the same things as at the last two Stations, Foraminifera being very abundant.

Station 351 (Sounding 501), Ascension Island to St. Vincent (see Chart 12).

Station 351.

April 12, 1876; lat. 9° 9′ N., long. 16° 41′ W.
Temperature of air at noon, 82°·5; mean for the day, 80°·8.
Temperature of water :—

Surface,	81·8	110 fathoms,	55·0
10 fathoms,	79·8	120 „	54·2
20 „	66·0	130 „	53·4
30 „	62·1	140 „	52·6
40 „	60·7	150 „	51·8
50 „	59·8	160 „	51·0
60 „	59·1	170 „	50·2
70 „	58·2	180 „	49·4
80 „	57·4	190 „	48·7
90 „	56·5	200 „	48·0
100 „	55·8		

Density at 60° F. :—

Surface,	1·02653	100 fathoms,	1·02620
25 fathoms,	1·02637	200 „	1·02606
50 „	1·02643	300 „	1·02582

At 1.40 P.M. stopped and took a series of temperatures down to 200 fathoms, about 30 miles from the 100-fathom line. At 2.30 P.M. proceeded.

Cape Verde distant at noon, 348 miles; Porto Praya, St. Iago, 538 miles. Made good 127 miles. Amount of current 5 miles, direction N.

Surface Organisms.—The following species are recorded from the surface at this Station :—

Organisms from Surface-Nets.

Copepoda (Brady, Zool. pt. 23).
Calanus gracilis, Dana.
Eucalanus attenuatus (Dana).
Undina vulgaris, Dana.
Scolecithrix danæ (Lubbock).
Euchæta prestandreæ, Philippi.
Leuckartia flavicornis, Claus.
Temora dubia (Lubbock).

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Candace pectinata, Brady.
Oithona challengerii, n.sp.
Setella gracilis, Dana.
Corycæus varius, Dana.
Oncæa obtusa (Dana).
Lubbockia squillimana, Claus.
Saphirina metallina, Dana.

Amphipoda (Stebbing, Zool. pt. 67).

Lycæa pulex, Marion.
Paralycæa hoylei, n.sp.

Isopoda.

One specimen, genus and species undetermined.

Cephalopoda (Hoyle, Zool. pt. 44).

Onychoteuthis sp. (?).

Tunicata (Herdman, Zool. pt. 76).

Pyrosoma sp., (young colony).
Salpa musculosa, n.sp.
,, *echinata*, n.sp.

The tow-nets procured a great many things, some of which indicated the nearness of land; Foraminifera were not nearly so abundant as on previous days. The following are recorded in the note-books:—*Globigerina*, *Orbulina*, *Hastigerina*, Acanthometræ and compound Radiolaria, Medusæ, Siphonophoræ, Bipinnaria and other Echinoderm larvæ, *Sagitta*, *Alciopa* and other Annelids, many larval Aphroditaceans, Daphnids, Copepods, Hyperids, Decapod larvæ, many larval Lamellibranchs and Gasteropods, *Echinospira*, *Atlanta*, Pteropods and larvæ, *Appendicularia*, *Salpa* (with Diatoms, *Peridinium*, and Coccospheres in the stomachs), and many small fishes. Several sharks were seen, and many other fishes jumping about at the surface.

Station 352.

Station 352 (Sounding 502), Ascension Island to St. Vincent (see Chart 12).

April 13, 1876; lat. 10° 55′ N., long. 17° 46′ W.
Temperature of air at noon, 76°·8; mean for the day, 75°·6.
Temperature of water:—

Surface,	77°·7	110 fathoms,	54°·6
10 fathoms,	75·0	120 ,,	54·1
20 ,,	69·1	130 ,,	53·6
30 ,,	63·7	140 ,,	53·1
40 ,,	60·9	150 ,,	52·7
50 ,,	58·8	160 ,,	52·3
60 ,,	57·2	170 ,,	51·9
70 ,,	56·4	180 ,,	51·5
80 ,,	55·9	190 ,,	51·1
90 ,,	55·4	200 ,,	50·7
100 ,,	55·0	300 ,,	46·5

Density at 60° F. :— STATION 352.

Surface, . . .	1·02662	100 fathoms, . . .	1·02618
25 fathoms, . . .	1·02645	200 „ . . .	1·02596
50 „ . . .	1·02624	300 „ . . .	1·02600

At 1.30 P.M. stopped and took a series of temperatures down to 300 fathoms, about 30 miles from the 100-fathom line off the Bijouga Islands; depth indicated on Admiralty Chart, 680 fathoms. At 2.50 P.M. proceeded under steam. Several Thalassidromas were seen, and on the evening of the 15th a swallow flew about the ship.

Cape Verde distant at noon, 237 miles; Bijouga Breakers, 66 miles N.E. Made good 127 miles. Amount of current 3 miles, direction N. 70° E.

Surface Organisms.—The following species are recorded from the surface at this Station :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Sphærozoum ovodimare, Haeckel.
Collosphæra polygona, Haeckel.
„ *pyriformis*, Haeckel (?).
„ *irregularis*, Haeckel.
Siphonosphæra cyathina, Haeckel.
„ *socialis*, Haeckel.
Haliomma tenellum, Haeckel.
Spongiomma helioides, Haeckel.
Rhizosphæra leptomita, Haeckel.
Tetrapyle pluteus, Haeckel.
Lithelius spiralis, Haeckel.
Litholophus rhipidium, Haeckel.
Zygacantha compressa, Haeckel.
Acanthonia mülleri, Haeckel.
Lithophyllium cruciatum, Haeckel.
Xiphacantha quadridentata, Haeckel.
„ *ciliata*, Haeckel.
Acanthostaurus purpurascens, Haeckel.
Amphilonche diodon, Haeckel.
„ *tetraptera*, Haeckel.
Hystrichaspis pectinata, Haeckel.
Icosaspis elegans, Haeckel.
Hexalaspis hexaglypha, Haeckel.
Lithomelissa bicornis, Ehrenberg.
Lithopera ananassa, Haeckel.
Arachnocorys circumtexta, Haeckel.
Theoconus campanulatus, Haeckel.
Dictyocha navicula, Ehrenberg.
Distephanus aculeata, Haeckel.
Challengeria xiphodon, Haeckel.
Medusetta tetranema, Haeckel.
Castanella channeri, Haeckel.
Castanidium murrayi, Haeckel.

SIPHONOPHORÆ (Haeckel, Zool. pt. 77).

Cucubalus pyramidalis, Haeckel.
Cuboides crystallus, n.sp.
Ersæa compressa, n.sp.
Mitrophyes peltifera, n.g., n.sp.
Praya galea, n.sp.
Polyphyes ungulata, n.g., n.sp.

COPEPODA (Brady, Zool. pt. 23).

Undina vulgaris, Dana.
Scolecithrix danæ (Lubbock).
Euchæta prestandreæ, Philippi.
„ *hessei*, n.sp.
Temora dubia (Lubbock).
„ *armata*, Claus.
Leuckartia flavicornis, Claus.
Candace pectinata, Brady.
Acartia laxa, Dana.
Oithona challengerii, n.sp.
Miracia efferata, Dana.

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Corycæus varius, Dana.
Copilia mirabilis, Dana.
Saphirina inæqualis, Dana.

Amphipoda (Stebbing, Zool. pt. 67).

Paraphronima cuivis, n.sp.
Simorhynchotus antennarius (Claus).
Rhabdosoma brevicaudatum, n.sp.

Stomatopoda (Brooks, Zool. pt. 45).

Alima gracilis, M.-Edwards (= larva of *Squilla*).

Schizopoda (Sars, Zool. pt. 37).

Euphausia pellucida, Dana.
Nematoscelis tenella, n.g., n.sp.
„ *rostrata*, n.g., n.sp.

Macrura (Spence Bate, Zool. pt. 52).

Platysaccus crenatus, n.g., n.sp.

Pteropoda (Pelseneer, Zool. pt. 65).

Cavolinia longirostris (Lesueur).

Cephalopoda (Hoyle, Zool. pt. 44).

Taonius suhmi (Lankester), n.sp.

Tunicata (Herdman, Zool. pt. 76).

Pyrosoma sp., (young colony).
Doliolum challengeri, n.sp.
„ sp., (blastozooids).
Salpa musculosa, n.sp.
„ *runcinata - fusiformis*, Chamisso—Cuvier.
„ *democratica - mucronata*, Forskål.
„ *quadrata*, n.sp.

Fishes (Günther, Zool. pt. 78).

Lichia glauca, Linné (?), (young).
Leptocephalus pellucidus, (young).
„ *brevirostris*, (young).

The tow-nets procured many things, including:—Oscillatoriaceæ, *Peridinium*, *Pyrocystis*, Diatoms, *Globigerina*, *Orbulina*, *Hastigerina*, *Pulvinulina*, Acanthometræ, compound, and other Radiolaria, Medusæ, *Physalia* and other Siphonophoræ, *Alciopa*, *Tomopteris*, Sabellid or Terebellid larvæ, Sipunculid larvæ, Daphnids, Copepods, Hyperids, Squillerichthus, *Lucifer*, Zoëæ, Megalopæ, and other Decapod larvæ, Pteropods and larvæ, *Appendicularia*, *Salpa*, many small fishes (*Leptocephalus*, Pleuronectids, &c.). Many flying fishes were seen.

At Cape Verdes.

The Challenger anchored off Porto Praya, St. Iago, Cape Verdes, at 12.30 A.M. on April 17, proceeding in the afternoon to Porto Grande, St. Vincent, anchoring there at 3.30 P.M. on April 18, and remaining there till 7 A.M. on April 26 (for list of animals, &c., obtained at the Cape Verdes see pp. 304–315).

Organisms from Surface-nets.

Surface Organisms.—The following were taken in the tow-nets while at anchor at the Cape Verdes:—*Globigerina* and other Foraminifera, Acanthometræ and other Radiolaria, Medusæ, Siphonophoræ, *Sagitta*, Annelid larvæ (*Polygordius* ?), Cypris stages of Cirripeds and other Crustacean larvæ.

The following species are recorded from the surface between the Cape Verdes and Station 353 (April 26 to 29) :— April 26 to 29, 1876.

Copepoda (Brady, Zool. pt. 23).

Calanus valgus, n.sp.
Undina vulgaris, Dana.
Scolecithrix danæ (Lubbock).
Euchæta prestandreæ, Philippi.
Candace pachydactyla, Dana.
Pontella acutifrons (Dana).
,, *strenua* (Dana).
Saphirina ovalis, Dana.
,, *gemma*, Dana.
Saphirinella stylifera (Lubbock).

Cirripedia (Hoek, Zool. pt. 25).

Lepas pectinata, Spengler.

Amphipoda (Stebbing, Zool. pt. 67).

Phrosina semilunata, Risso.
Platyscelus armatus (Claus).
,, *serratulus*, n.n.
Hemityphis tenuimanus, Claus.
Tetrathyrus forcipatus, Claus.
Thyropus sphæroma (Claus).
Eupronoë atlantica, n.sp.
Tryphana boecki, n.sp.

Schizopoda (Sars, Zool. pt. 37).

Euphausia pellucida, Dana.
Nematoscelis microps, n.g., n.sp.
Stylocheiron abbreviatum, n.g., n.sp.
Siriella thompsoni (M.-Edwards).

Pelagic Hemiptera (White, Zool. pt. 19).

Halobates wüllerstorfi, Frauenfeld.

Cephalopoda (Hoyle, Zool. pt. 44).

Tremoctopus quoyanus (d'Orbigny), Steenstrup.
Spirula peronii, Lamarck, (dead shells).
Ommastrephes sp. (?).

Tunicata (Herdman, Zool. pt. 76).

Doliolum denticulatum, Quoy and Gaimard.
,, *ehrenbergi*, Krohn.
Salpa cordiformis-zonaria, Quoy and Gaimard—Pallas.
,, *cylindrica*, Cuvier.
,, *runcinata - fusiformis*, Chamisso—Cuvier.

Fishes (Günther, Zool. pts. 57 and 78).

Astronesthes niger, Rich.
Coryphæna hippurus, (young).
,, *equisetis*, (young).
Scopelus caninianus (C.V.).
,, *coccoi* (Cocco).
Scombresox saurus, (young).
Exocoetus obtusirostris, Günther.
,, *evolans*, Linné.
,, *rondeletii*, C.V.

The tow-nets procured the following:—*Peridinium*, *Pyrocystis*, *Ethmodiscus*, *Coscinodiscus*, and other Diatoms, *Globigerina*, *Orbulina*, *Pullenia*, *Sphæroidina*, *Pulvinulina*, Acanthometræ, compound and other Radiolaria, Medusæ, *Diphyes*, *Agalmopsis*, *Velella*, and other Siphonophoræ, Echinoderm larvæ, *Sagitta* (some with *Distomum*), Annelid larvæ, Sipunculid larvæ, *Evadne*, *Copilia*, *Saphirina*, and other Copepods, Cypris stage of *Lepas*, Hyperids, Isopods, young *Euphausiæ*, *Lucifer*, *Phyllosoma*, *Sergestes* and larvæ, Zoëæ, Megalopæ, *Halobates*, larval Lamellibranchs,

April 26 to 29, 1876.

small *Ianthinæ*, *Atlanta*, *Heterofusus* [= *Limacina*], *Pleuropus* [= *Cavolinia*], and other Pteropods, *Spirula* shells (with *Lepas* attached) and other Cephalopods, *Doliolum*, *Appendicularia*, *Salpa* (with Coccospheres, Rhabdospheres, *Peridinium*, small Acanthometræ, and large orange-coloured cells in the stomachs), *Leptocephalus*, Scopelids, flying fishes and young, and other small fishes. The eyes of the larval *Euphausiæ* were the chief cause of phosphorescence; one Copepod gave off light from several parts of its body when irritated, and sometimes the eyes of the Megalopæ gave off a little light, as did also Tornaria. Several large balls of phosphorescence went past the ship occasionally in the evening, evidently *Pyrosomæ*, while large flashes were seen apparently pretty far down in the water, which may have been caused by fishes.

Station 353.

Station 353 (Sounding 503), St. Vincent towards Azores (see Chart 6 and Diagram 7).

May 3, 1876; lat. 26° 21′ N., long. 33° 37′ W.

Temperature of air at noon, 70°·0; mean for the day, 69°·1.

Temperature of water:—

	°		°
Surface,	70·7	190 fathoms,	59·4
10 fathoms,	69·7	200 „	58·8
20 „	69·0	225 „	57·4
30 „	68·2	250 „	56·1
40 „	67·6	275 „	55·0
50 „	67·1	300 „	53·9
60 „	66·5	400 „	49·5
70 „	66·0	500 „	46·3
80 „	65·4	600 „	43·5
90 „	64·9	700 „	41·5
100 „	64·3	800 „	40·3
110 „	63·8	900 „	39·7
120 „	63·2	1000 „	39·2
130 „	62·7	1100 „	38·8
140 „	62·1	1200 „	38·5
150 „	61·6	1300 „	38·2
160 „	61·0	1400 „	37·9
170 „	60·5	1500 „	36·6
180 „	59·9	Bottom,	36·6

Density at 60° F.:—

Surface,	1·02768	300 fathoms,	1·02691
25 fathoms,	1·02753	400 „	1·02636
50 „	1·02736	2500 „	1·02678
100 „	1·02712	Bottom,	1·02708
200 „	1·02683		

Depth, 2965 fathoms; deposit, Red Clay, containing 11·12 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.). Station 353.

At 1.15 P.M. shortened and furled sails, and proceeded under steam. At 2 P.M. sounded in 2965 fathoms. The sounding-tube had sunk fourteen inches into the bottom and brought up over a litre of Red Clay, the deeper portions being darker coloured, and containing less carbonate of lime, than the surface layers; manganese grains and fishes' teeth were more abundant in the lower layer. Took serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 200 fathoms and bottom (?), and amounted respectively to 38·7 and 36·8 milligrammes per litre. On the evening of May 1 a straggling flock of birds, possibly wide-awakes, were seen at a great distance from the ship.

Fayal Island, Azores, distant at noon, 780 miles. Made good 158 miles. Amount of current 25 miles, direction S. 67° W.

Radiolaria (Haeckel, Zool. pt. 40).—The following species of Radiolaria were observed in the deposit from this Station :— Organisms from the Deposit.

Cenosphæra plutonis, Ehrenberg.
Staurosphæra jacobi, Haeckel.
Staurolonche gassendii, Haeckel.
Hexalonche castanella, Haeckel.
Haliomma horridum, Stöhr.
Cromyomma quadruplex, Haeckel.
Prunulum triplex, Haeckel.
Ommatocampe erucæformis, Haeckel.
Desmocampe aphrodite, Haeckel.
Sethostaurus rhombostaurus, Haeckel.
Ommatodiscus fragilis, Stöhr.
Stylodictya octogonia, Haeckel.
Euchitonia lanceolata, Haeckel.
Pentophiastrum caudatum, Haeckel.
Dendrospyris ramosa, Haeckel.
Petalospyris papillata, Haeckel.
Botryocella tricellaris, Haeckel.
Archiphormis cancellata, Haeckel.
Lophoconus cornutella, Haeckel.
Theocapsa forskalii, Haeckel.
Auloceros trigeminus, Haeckel.
Orosphæra spinigera, Haeckel.

Surface Organisms.—The following species are recorded from the surface in the vicinity of this Station :— Organisms from Surface-Nets.

Radiolaria (Haeckel, Zool. pt. 40).

Sphærozoum ovodimare, Haeckel.
Collosphæra polygona, Haeckel.
Siphonosphæra socialis, Haeckel.
Xiphosphæra ceres, Haeckel.
Staurolonche pertusa, Haeckel.
Hexastylus longispinus, Haeckel.
Haliomma tenuispinum, Müller.
„ *tenellum*, Haeckel.
Echinomma sphærechinus, Haeckel.
Rhizoplegma trigonacantha, Haeckel.
Spongosphæra polyacantha, Müller.
Rhizosphæra leptomita, Haeckel.
Spongurus spongechinus, Haeckel.
Cyphonium cribellum, Haeckel.
Distriactis alterna, Haeckel.
Chitonastrum dicranodes, Haeckel.
Trizonium decabelonium, Haeckel.
Tetrapyle tetracantha, Haeckel.

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Tetrapyle pluteus, Haeckel.
Amphitholus armatus, Haeckel.
Staurotholonium lenticulare, Haeckel.
Tholocubus tesserarius, Haeckel.
Spirenna lentellipsis, Haeckel.
Lithelius spiralis, Haeckel.
Lithophyllium cruciatum, Haeckel.
Xiphacantha quadridentata, Haeckel.
Acanthostaurus purpurascens, Haeckel.
Amphilonche tetraptera, Haeckel.
Phractaspis cataphracta, Haeckel.
Tessaraspis quadriforis, Haeckel.
Icosaspis elegans, Haeckel.
Phatnaspis orthopora, Haeckel.
Lithomelissa bicornis, Ehrenberg.
Arachnocorys circumtexta, Haeckel.
Dictyoceras formica, Haeckel.
Sagena crucifera, Haeckel.
Aulatractus diploconus, Haeckel.
Challengeron balfouri, Murray.
Castanella channeri, Haeckel.
Castanidium murrayi, Haeckel.

Siphonophoræ (Haeckel, Zool. pt. 77).

Ersæa compressa, n.sp.
Diphyopsis compressa, n.g., n.sp.

Copepoda (Brady, Zool. pt. 23).

Calanus gracilis, Dana.
Hemicalanus longicornis, Claus.
Pleuromma abdominale (Lubbock).
Heterochæta spinifrons, Claus.
Leuckartia flavicornis, Claus.
Undina darwinii, Lubbock.
Scolecithrix danæ (Lubbock).
Euchæta prestandreæ, Philippi.
Centropages violaceus, Claus.
Candace pachydactyla, Dana.
,, *truncata*, Dana.
Oithona challengerii, n.sp.
Corycæus varius, Dana.
,, *venustus*, Dana.

Schizopoda (Sars, Zool. pt. 37).

Thysanopoda microphthalma, n.sp.
Nematoscelis rostrata, n.g., n.sp.

Nudibranchiata (Bergh, Zool. pt. 26).

Glaucus atlanticus, Forster.
Scyllæa pelagica, Linné.

Pteropoda (Pelseneer, Zool. pt. 65).

Clio (*Creseis*) *acicula* (Rang).
Cavolinia quadridentata (Lesueur).
,, *longirostris* (Lesueur).

Tunicata (Herdman, Zool. pt. 76).

Doliolum sp., (blastozooid).
Salpa democratica - mucronata, Forskål.

Fishes (Günther, Zool. pt. 78).

Prymnothonus sp., (young).

The tow-nets at the surface and down to 80 fathoms yielded:—Oscillatoriaceæ, *Pyrocystis*, *Orbulina*, compound Radiolaria, *Diphyes* and other Siphonophoræ, *Sagitta*, *Alciopa*, *Tomopteris*, *Cypridina*, Copepods, Hyperids, Phronimids, *Euphausia* larvæ, *Sergestes* larvæ, *Atlanta*, *Pterotrachea*, Pteropods and larvæ, *Appendicularia*, *Salpa*, and small fishes. On May 4 and 5 large quantities of gulf-weed were passed, and several patches were taken in the tow-net, along with Hydroids, shrimps, crabs, *Scyllæa*, Polyzoa, and pipe-fish; on both days a few small pieces of pumice, covered with a green Alga and *Serpula*, were procured in the net. Many *Physaliæ* floated past the ship.

Station 354 (Sounding 505), St. Vincent towards Azores (see Chart 6 and Diagram 7). STATION 354.

May 6, 1876; lat. 32° 41′ N., long. 36° 6′ W.

Temperature of air at noon, 72°·3; mean for the day, 69°·9.

Temperature of water :—

	°		°
Surface,	70·0	700 fathoms,	42·8
25 fathoms,	68·2	800 „	41·2
50 „	66·2	900 „	39·9
75 „	64·8	1000 „	39·1
100 „	63·2	1100 „	38·6
200 „	58·0	1200 „	38·4
300 „	53·5	1300 „	38·2
400 „	49·7	1400 „	38·1
500 „	46·7	1500 „	38·0
600 „	44·5	Bottom,	37·8

Density at 60° F. :—

Surface,	1·02729	300 fathoms,	1·02669
25 fathoms,	1·02704	400 „	1·02654
50 „	1·02693	600 „	1·02627
100 „	1·02698	1200 „	1·02726
200 „	1·02701	Bottom,	1·02665

Depth, 1675 fathoms; deposit, Globigerina Ooze, containing 90·58 per cent. of carbonate of lime (see Murray and Renard, Deep-Sea Deposits Chall. Exp.).

At 1.30 P.M. took in sail and stopped to sound. At 2 P.M. sounded in 1675 fathoms. Took serial temperatures down to 1500 fathoms. The carbonic acid was determined in water from 400 fathoms, and amounted to 38·7 milligrammes per litre. Passed quantities of gulf-weed. At 4.30 P.M. completed observations, and proceeded under steam. A Mother Carey's chicken was seen on May 7.

Fayal Island distant at noon, 510 miles. Made good 145 miles. Amount of current 3 miles, direction N. 41° E.

Surface Organisms.—The following species are recorded from the surface and deep tow-nets at this Station :— ORGANISMS FROM SURFACE-NETS.

RADIOLARIA (Haeckel, Zool. pt. 40).

Sphærozoum ovodimare, Haeckel.
„ *quadrigeminum*, Haeckel.
Carposphæra infundibulum, Haeckel (?).
Collosphæra polygona, Haeckel.
Hexastylus sapientum, Haeckel.
Hexalonche seleuci, Haeckel.
Hexacontium furcatum, Haeckel.
Acanthosphæra acufera, Haeckel.
Haliomma megaporum, Ehrenberg.
„ *tenellum*, Haeckel.
Spongechinus cavus, Haeckel.
Rhizosphæra leptomita, Haeckel.

Station 354.

Spongodruppa polyacantha, Haeckel.
Sethostylus hastatus, Haeckel.
Astrophacus trochiscus, Haeckel.
Amphicyclia amphistyla, Haeckel.
Amphymenium amphistylium, Haeckel.
Rhopalastrum martellum, Haeckel.
Euchitonia triangulum, Haeckel.
Larnacantha decacantha, Haeckel.
Amphipyle decaceros, Haeckel.
Octopyle tetrastyle, Haeckel.
Tholospira hystrix, Haeckel.
Acanthometron bulbosum, Haeckel.
,, *catervatum*, Haeckel.
Acanthonia fragilis, Haeckel.
,, *quadrangula*, Haeckel.
Lithophyllium cruciatum, Haeckel.
Xiphacantha quadridentata, Haeckel.
Acanthostaurus purpurascens, Haeckel.
,, *forceps*, Haeckel.
Amphilonche tenuis, Haeckel.
,, *tetraptera*, Haeckel.
Tessaraspis rotunda, Haeckel.
Icosaspis elegans, Haeckel.
Phatnaspis loculata, Haeckel.
Hexaconus velatus, Haeckel.
Lithocircus decimalis, Haeckel.
,, *magnificus*, Haeckel.
Anthospyris arachnoides, Haeckel.
Bathropyramis interrupta, Haeckel.
Sethopera oceania, Haeckel.
Sethophormis hexagonalis, Haeckel.
Acanthocorys umbellifera, Haeckel.
Arachnocorys circumtexta, Haeckel.
Carpocanium microdon, Ehrenberg.
Pleuropodium cortina, Haeckel.
Clathrocyclas danaës, Haeckel.
Dictyocha navicula, Ehrenberg.
Challengeron balfouri, Murray.
Gazelletta cyrtonema, Haeckel.
Castanella channeri, Haeckel.
Castanidium murrayi, Haeckel.
Castanissa richardsi, Haeckel.
Castanopsis fergusoni, Haeckel.
Conchidium productum, Haeckel.
Cœlothamnus bivalvis, Haeckel.

Medusæ (Haeckel, Zool. pt. 12).

Cunarcha æginoides, n.g., n.sp.

Siphonophoræ (Haeckel, Zool. pt. 77).

Bassia obeliscus, n.sp.
Arethusa challengeri, n.g., n.sp.

Copepoda (Brady, Zool. pt. 23).

Euchæta prestandreæ, Philippi.

Cirripedia (Hoek, Zool. pt. 25).

Lepas anserifera, Linné.

Amphipoda (Stebbing, Zool. pt. 67).

Primno macropa, Guérin (?).

Schizopoda (Sars, Zool. pt. 37).

Thysanoëssa gregaria, n.sp.

Macrura (Spence Bate, Zool. pt. 52).

Sergestes atlanticus, M.-Edwards.
,, *longispinus*, n.sp.
,, *semiarmis*, n.sp.
Latreutes ensiferus (M.-Edwards).
Acanthephyra purpurea, M.-Edwards.

Brachyura (Miers, Zool. pt. 49).

Neptunus (*Neptunus*) *sayi*, M.-Edwards.

The tow-nets at the surface and down to 80 fathoms yielded:—*Ethmodiscus*, *Coscinodiscus*, and other Diatoms, *Orbulina*, compound Radiolaria, Medusæ, *Diphyes*, *Sagitta*, *Alciopa*, *Tomopteris*, *Cypridina*, *Copilia* and other Copepods, Hyperids, *Euphausia*, *Atlanta*, Pteropods, *Appendicularia*, *Doliolum*. Tow-nets were also sent down to 1000 and 1500 fathoms, and contained, in addition to the foregoing:—Challengeridæ and other Radiolaria, large *Cypridinæ*, large Phronimids, large red shrimps,

young *Amphioxus* and several Sternoptychidæ. There was much sea-weed on the surface, and a quantity was collected from a boat. STATION 354.

The following species are recorded from the surface between Station 354 and the coast of Europe (May 7 to 20) :— MAY 7 TO 20, 1876.

COPEPODA (Brady, Zool. pt. 23).

Calanus gracilis, Dana.
Pleuromma abdominale (Lubbock).
Euchæta prestandreæ, Philippi.
,, *pulchra* (Lubbock).

AMPHIPODA (Stebbing, Zool. pt. 67).

Paraphronima cuivis, n.sp.

SCHIZOPODA (Sars, Zool. pt. 37).

Thysanopoda tricuspidata, M.-Edwards.
Nematoscelis rostrata, n.g., n.sp.

MACRURA (Spence Bate, Zool. pt. 52).

Sergestes atlanticus, M.-Edwards.
Amphion provocatoris, n.sp.

PTEROPODA (Pelseneer, Zool. pts. 58 and 65).

Pneumonoderma violaceum, d'Orbigny.
Limacina bulimoides (d'Orbigny).
,, *lesueuri* (d'Orbigny).
Clio (*Hyalocylix*) *striata* (Rang).
,, (*Styliola*) *subula* (Quoy and Gaimard).
,, *pyramidata*, Linné.
Cuvierina columnella (Rang).

TUNICATA (Herdman, Zool. pt. 76).

Doliolum ehrenbergi, Krohn.
,, sp. (blastozooids).
Salpa runcinata - fusiformis, Chamisso—Cuvier.

FISHES (Günther, Zool. pt. 78).

Scombresox saurus, (young).

The tow-nets procured :—*Pyrocystis*, *Orbulina*, compound Radiolaria, Medusæ (*Discophora* ?), *Diphyes*, *Physalia*, and other Siphonophoræ, *Sagitta*, *Cypridina*, Hyperids, Phronimids, *Oxycephalus*, Isopods, *Euphausia*, *Sergestes*, *Amphion*, *Atlanta*, Pteropods, small Cephalopods, *Salpa* (with Coccospheres, young Foraminifera, *Peridinium* and *Pyrocystis*, in the stomachs), and small fishes. Patches of water of a very green colour were passed through on the 13th and 14th, the colour being apparently due to immense numbers of minute spherical organisms (Infusoria), many of them with a yellow-brown sarcode, which moved very rapidly across the field of the microscope, and also to very many minute Protococci. The water was afterwards of a clear blue colour, but on approaching the coast of Spain it again assumed a dark green colour.

The Challenger entered Vigo Bay at 2 P.M. on May 20, and left again at 2 P.M. on May 21, proceeding thence to Portsmouth. The following species of Ostracoda were observed in the mud brought up on the anchor from 11 fathoms in Vigo Bay :— AT VIGO BAY.

Vigo Bay. Organisms from the Deposit.

Ostracoda (Brady, Zool. pt. 3).

Paracypris polita, Sars.
Cythere tenera, Brady.
,, *stimpsoni*, Brady.
Loxoconcha guttata (Gorman).
Cytheropteron intermedium, Brady.
Paradoxostoma ensiforme, Brady.
Polycope orbicularis, Sars.

Organisms from Surface-Nets.

Surface Organisms.—The following species is recorded from the surface in Vigo Bay :—

Amphipoda (Stebbing, Zool. pt. 67).

Gammarus locusta (Linné).

The tow-nets yielded in addition :—Many *Noctilucæ*, *Peridinium*, Diatoms, Medusæ, *Evadne*, Copepods, Cirriped larvæ, Zoëæ, larval Lamellibranchs and Gasteropods, *Appendicularia*, and larval fishes.

North Atlantic.

The following species are recorded from deep water dredgings (over 1000 fathoms) in the North Atlantic, the exact locality not being noted :—

Animals from Dredge and Trawl.

Lamellibranchiata (Smith, Zool. pt. 35).

Lucina (*Codakia*) *tigerina* (Linné). Obtained at no other locality by the Challenger.
Montacuta cylindracea, n.sp. Obtained at no other locality.

Gasteropoda (Watson, Zool. pt. 42).

Clathurella streptophora, n.sp. Obtained at no other locality.
Natica radiata, n.sp. Obtained also at Station 33.
Mitrularia uncinata (Reeve). Obtained also at Stations 113A and 122.
Siliquaria (*Tenagodus*) *bernardii*, Mörch. Obtained at no other locality by the Challenger. Recorded from Senegal.

Organisms from Surface Nets.

The following species are recorded from the surface of the North Atlantic, the exact locality not being noted :—

Amphipoda (Stebbing, Zool. pt. 67).

Amphithyrus bispinosus, Claus.

Macrura (Spence Bate, Zool. pt. 52).

Mastigopus suhmi, n.sp.
Sergestes ovatoculus, n.sp.
,, *penerinkii*, n.sp.
Lucifer typus, Thompson.
,, *reynaudii*, M.-Edwards.
Hectarthropus tenuis, n.g., n.sp.

Cephalopoda (Hoyle, Zool. pt. 44).

Alloposus mollis, Verrill.

The localities of the following species recorded in the Zoological Reports are unknown, owing to the labels having become illegible or lost :— Localities Uncertain.

Tetractinellida (Sollas, Zool. pt. 63).

Discodermia ornata, n.sp.
Azorica crassiuscula, n.sp.

Actiniaria (Hertwig, Zool. pt. 73).

Hormathia delicatula, n.sp.

Corals (Moseley, Zool. pt. 7).

Sphenophyllia flabellum, n.g., n.sp. The only species of the genus.

Ostracoda (Brady, Zool. pt. 3).

Polycope cingulata, n.sp.

Copepoda (Brady, Zool. pt. 23).

Echthrogaleus affinis, M.-Edwards.
Perissopus dentatus (Steenstrup and Lütken).
Nogagus grandis, Steenstrup and Lütken.

Isopoda.

Eighteen specimens, genera and species undetermined.

Anomura (Henderson, Zool. pt. 69).

Paralomis verrucosus (Dana).

Tunicata (Herdman, Zool. pt. 38).

Atopogaster informis, n.g., n.sp.
Amaroucium hepaticum, n.sp.
Psammaplidium rude, n.g., n.sp.
Leptoclinum neglectum, n.sp.
Cynthia pallida, Heller.

Remarks on the foregoing Station Lists.

In the foregoing account of the scientific work carried out, and of the general results obtained, at each of the Challenger observing stations at sea, no mention has been made of a large number of observations recorded during the early part of the voyage in the note books, as these had become obsolete in the light of subsequent knowledge acquired during the cruise. Could the various problems regarding oceanic phenomena have been viewed through the experience gained during the voyage and subsequently, many of the preceding descriptions would certainly have been much more complete, for fuller details might frequently have been furnished concerning many matters which did not at the time appear of great importance.

Preliminary Work on Board the Challenger.

It must be remembered that the exploration of the deep sea was in its infancy at the outset of the Expedition. The work was almost entirely new to the naval officers and the members of the civilian staff. It took several months to test the various appliances and instruments, to settle the methods of observation, to arrange the best way of recording the different results, and to apportion the work among the members of the scientific staff. As time went on, the proceedings of the ship, and the operations on

board, were conducted with increasing certainty and success. From want of time, from stress of weather, and other causes, it was very frequently impossible to carry out all the desirable observations at the different positions, hence there is a very great disproportion in the information recorded at the various stations.

Method of Work on board Ship.

When the Challenger left England no definite arrangements had been made as to how the biological work was to be distributed among the naturalists, or what was to be done with the collections brought together during the Expedition. In the course of a few months the specimens from land expeditions, from shallow-water and deep-sea dredgings and trawlings, had accumulated to such an extent in the work-rooms as to be exceedingly inconvenient; many of them had commenced to suffer, and a few were actually destroyed, from insufficient attention in their preservation. It became absolutely necessary to apportion the work, and to agree on a plan with reference to the collections as a whole. Some of the naturalists held that their first duty was to examine the specimens procured, to figure and describe the most interesting, and to reduce the preserved collections to the smallest possible bulk. Others were of opinion that the largest possible collections should be made, and that their chief duty should be to note the condition of the specimens in the living state or at the time of capture, it being urged that the successful description of the collections could only take place after the return of the Expedition. It soon became evident that large collections, even of one group, could not be retained in the work-rooms for comparison and description. At short intervals it was necessary to clear away the specimens to make room for those captured at succeeding stations, and when once placed in the hold of the ship the specimens were not again easily available for examination. The labour of preserving, labelling, packing, and storing the collections was very great, and members of the Expedition felt that these collections should not be distributed to specialists at home before the return of the Expedition, for in that case many of their observations on board ship could not be subjected to the test of subsequent examination. Perfect agreement probably never existed among the naturalists as to the best manner of dealing with the zoological collections, but arrangements were ultimately made which enabled the investigations to be carried on with convenience and success.

The Challenger Collections.

It was understood that the naturalists should not send home private collections. It was arranged, with the consent of the Admiralty, that all the collections should be sent to Professor William Turner of the University of Edinburgh, who, at the request of his colleague, Professor Wyville Thomson, undertook to examine their condition on arrival, and to take charge of them till the return of the Expedition. These collections, as well as those brought home in the ship, were stored in the University of Edinburgh for many years free of cost to the Government.

When the contents of a dredge or trawl were being examined after a successful haul, Professor Thomson usually took charge of the Echinoderms, Dr von Willemoes-Suhm of the Crustaceans and Annelids, Mr Moseley of the Corals, Molluscs, and Sponges, and Mr

Murray of the Fishes, Protozoa, and all that related to the deep-sea deposits. Immediately after the examination of the contents of the dredge or trawl, one of the naturalists entered the names of the species, so far as known, in a book called the "Station Book," with remarks as to the number of specimens and their condition. This arrangement worked very well. During the first few months of the Expedition a few specimens may, from insufficient arrangements, have been destroyed, but as the naturalists became more accustomed to work on board ship, hardly a specimen from any of the deep-sea stations was lost or misplaced. Doubtless some of the smaller forms and parasites may have escaped observation when the trawl came in late in the evening, or when the weather did not permit careful examination, and some delicate fishes and invertebrates from deep water were mutilated beyond identification; but with these exceptions, the foregoing lists of the organisms taken in the deep-water trawlings and dredgings may be regarded as a complete record of all the species captured, with the exception of the Protozoa. In the early part of the cruise small samples only of the deposits were preserved, from the belief that the quantity brought up was much greater than would be required for any scientific purpose; all the deposit in the trawl or dredge was, however, passed through sieves before being thrown away, and the larger particles thus procured were preserved. In the later years of the voyage much larger quantities of the deposits were preserved and brought home.

Work of Naturalists during Dredging and Trawling Operations.

At almost every place where the ship came to anchor extensive collections of marine animals were made by trawlings and dredgings from the steam pinnace in shallow water. These collections were made use of by the naturalists for their own study and information, but only mere fractions of them were preserved, with the exception of collections made on a few remote or rarely visited coasts. This accounts for the rather meagre lists of shallow-water marine animals recorded at many places visited by the Expedition, especially during the early part of the voyage. It was thought that the extensive preservation of shallow-water marine specimens might seriously interfere with the more important investigations of the deep sea, which were rightly regarded as the special and proper sphere of our labours. Even on board the Challenger there was a limit to the number of specimen-bottles, the quantity of spirit for the preservation of specimens, and of space for storage. Still, with a little arrangement before-hand, many valuable collections might have been dispatched direct to Great Britain without necessarily hampering the peculiar researches for the prosecution of which the Expedition was organised, and the national collections might in this way have been greatly enriched by many excellent collections and new species of organisms from distant parts of the world.

Shore and Shallow-water Collections.

The tow-nets made of bunting, fine cotton cloth, gauze or silk, were continually dragged through the surface and sub-surface waters of the ocean, and were frequently sent to great depths. Very many separate collections of pelagic organisms were made in this way during a single day when the conditions were favourable, and these were at the time

Collections from Tow-nets.

submitted to a microscopic examination by the naturalists. Notes concerning these collections were always entered in the journals stating the general character of the fauna and flora, along with particulars about rare or unusual occurrences. Many hundreds of microscopic preparations of these pelagic organisms were mounted in various preserving mediums. The reports of Professor Haeckel and Mr Brady concerning the pelagic Radiolaria and Foraminifera were largely based upon the microscopic preparations thus mounted during the voyage by Mr Murray. Samples of these tow-net gatherings were also preserved in spirit, but no systematic attempt was made to form complete collections of pelagic organisms representing each region of the ocean visited by the Expedition. To have preserved all the collections from the surface waters would have been beyond the resources at our command. Even those collections of pelagic organisms that were brought home were so large that they have not yet all been carefully examined by specialists.

When we remember all the varied researches in which the Expedition was engaged, the wonder is that so much was accomplished, rather than that some fields of investigation were only partially explored.

The Steam-Pinnace fitted for dredging in shallow-water.

BATHYMETRICAL AND GEOGRAPHICAL DISTRIBUTION.

From whatever point of view the student may approach problems in any way connected with Oceanography, he will find the large amount of information brought together in the foregoing pages of great assistance in forming a general picture of the physical and biological conditions prevailing in the different regions of the Great Ocean Basins.

The principal object in view in preparing the preceding descriptions has been to summarize the observations at each of the stations. This great array of new facts may be compared and discussed in many ways. At one time it was proposed to conclude these volumes with a large number of other Summaries of a special and of a general kind, and to discuss in detail the many theoretical views suggested by the Challenger's researches. It is not now possible to carry out this intention in the present work, for the completion of the Challenger Report is urgently demanded. A few of the Summaries bearing on the bathymetrical and geographical distribution of the animals captured in the trawl or dredge are, however, appended for the convenience of naturalists. These organisms are for the most part believed to have lived on or near the bottom of the ocean. In all cases, however, the naturalists simply recorded the greatest depth to which the trawl or dredge was believed to have descended at each station. It is evident that the instrument may in the course of its progress have been dragged into deeper or shallower water than was recorded by the sounding line, and may have captured animals in its descent through the water, or in being hauled up again to the surface. In the great majority of cases there is little difficulty in separating the animals captured on the bottom from those taken in the surface and sub-surface waters. Those about which there is some doubt, and those in the following lists which belong to the surface or intermediate waters, will be referred to later on. In preparing the lists, however, it was considered the best plan, in the first instance, simply to take all the animals brought up in the trawl or dredge at each station as the basis of the following lists.

The species have been grouped together in seven zones of depth, viz. :—

(1), The zone deeper than 2500 fathoms ; (2), The zone between 2000 and 2500 fathoms ; (3), The zone between 1500 and 2000 fathoms ; (4), The zone between 1000 and 1500 fathoms ; (5), The zone between 500 and 1000 fathoms ; (6), The zone between 100 and 500 fathoms ; (7), The zone between 0 and 100 fathoms.

For the deeper of these zones an interval of 500 fathoms has been chosen, while, in order to separate the essentially shallow-water species, the 100-fathom line has been adopted as the limit of the shallowest zone.

In the first of the following lists, for example, all the animals procured in the trawls

or dredges at the 25 stations where the recorded depths were greater than 2500 fathoms, are enumerated in zoological sequence from the Sponges to the Fishes. Those animals which were taken in this deepest zone and not anywhere else outside of it during the Expedition are indicated by an asterisk. This list is followed by subsidiary lists in small type, viz.:—First, a list of those species taken at more than one Station within the zone deeper than 2500 fathoms; second, a list of those species taken in the zone below 2500 fathoms as well as in the next shallower zone between 2000 and 2500 fathoms, and similar lists for those species common to this deepest zone (deeper than 2500 fathoms) and the still shallower succeeding zones up to the shallowest; third, a list showing the new genera taken only in the zone deeper than 2500 fathoms, and the number of species belonging to each of these genera.

The species procured by the dredge and trawl in the zone between 2000 and 2500 fathoms are treated in an exactly similar manner, and so on with each succeeding shallower zone, but in the subsidiary lists it is unnecessary to repeat the lists of species common to the zone under consideration and the deeper zones, as these species appear already in the lists of animals from the deeper zones, and the pages are merely referred to.

In order to avoid the repetition of the names, and to save the large amount of space necessarily involved in publishing similar lists to show the geographical distribution of the animals procured by the dredge and trawl during the Challenger Expedition, the bathymetrical lists have been made subservient to that purpose by adopting the expedient of using the letters S, T, and N, to denote the distribution in tropical and extra-tropical areas:—S placed after the name of a species indicates that it was taken south of the tropic of Capricorn; T placed after the name of a species indicates that it was taken within the tropics of Capricorn and Cancer; N placed after the name of a species indicates that it was taken north of the tropic of Cancer. These letters represent the geographical distribution of the species irrespective of depth, and they simply point out the area or areas in which the species was obtained by the Challenger. It must be borne in mind that all the information in these distributional lists refers only to the collections of the Challenger Expedition. Thus, if a previously-described species occur in the lists with an asterisk, it must not be presumed that the species has never been observed except in that zone of depth, but merely that the Challenger obtained the species only in that zone. Again, if a previously-described species appear with the letters S and T, it must not be supposed that the species has never been observed north of the northern tropic, but merely that the Challenger obtained the species only to the south of the northern tropic. If, for instance, a species with an asterisk has only S after it, then it was obtained by the Challenger in that zone only, and south of the southern tropic. In considering the percentages given in the following notes, it must be remembered that a certain number of species found in more than one zone are therefore counted twice or oftener.

1. Animals obtained in the Dredgings and Trawlings in the Zone deeper than 2500 Fathoms.

The Challenger trawled or dredged at 25 Stations where the depth was 2500 fathoms and over, about 600 specimens of invertebrates and fishes being procured, belonging to about 235 species and about 200 genera. A number of these specimens were so mutilated when hauled on board that they were not preserved; others though brought home did not reach the hands of the specialists preparing the Challenger Reports, or were not in a condition to be described. The total number of species and genera actually described and recorded in the Zoological Reports from these depths amounts to 161 species and 127 genera, of which 140 species (or 87 per cent. of the total number of species recorded in the Reports) and 50 genera (or 39 per cent.) are new to science, as shown in the following list. Those species taken by the Challenger in this zone only (numbering 96 species, or 60 per cent.) are indicated by an asterisk thus.* The geographical distribution of the species is indicated by the heavy letters S, T, and N, used to denote that the species was taken *south* of the tropic of Capricorn (S), *between* the tropics of Capricorn and Cancer (T), or *north* of the tropic of Cancer (N).

Deep-Sea Keratosa :

* *Ammoconia sagenella*, n.g., n.sp. N
* *Ammolynthus haliphysema*, n.g., n.sp. T
* *Psammina nummulina*, n.g., n.sp. T
* *Psammopemma radiolarium*, n.sp. T
* *Psammophyllum annectens*, n.g., n.sp. N
* *Stannarium alatum*, n.g., n.sp. T
* ,, *concretum*, n.g., n.sp. T
Stannoma coralloides, n.g., n.sp. T
,, *dendroides*, n.g., n.sp. T

Monaxonida :

* *Chondrocladia concrescens* (Schmidt). N
* *Cladorhiza abyssicola*, Sars, var. *rectangularis*, nov. T
* ,, *longipinna*, n.sp. T

Hexactinellida :

Bathydorus fimbriatus, n.g., n.sp. N
* *Euplectella crassistellata*, n.sp. T
Holascus fibulatus, n.g., n.sp. S
* ,, *stellatus*, n.g., n.sp. S
* *Hyalonema* (*Stylocalyx*) *tenerum*, n.sp. S
* *Hyalostylus dives*, n.g., n.sp. S
* *Trachycaulus gurlittii*, n.g., n.sp. S

Antipatharia :

Bathypathes patula, n.g., n.sp. T N
* ,, *tenuis*, n.g., n.sp. S

Actiniaria :

Amphianthus ornatum, n.g., n.sp. N
* *Antheomorphe elegans*, n.g., n.sp. N
* *Porponia elongata*, n.g., n.sp. S
* *Sicyonis elongata*, n.g., n.sp. N
* Another Actinian undetermined. N

Corals :

Bathyactis symmetrica (Pourtalès). S T N

Hydroida :

* *Cryptolaria abyssicola*, n.sp. S
* „ *diffusa*, n.sp. T
* *Halisiphonia megalotheca*, n.g., n.sp. S
Monocaulus imperator, n.sp. N
* *Stylactis vermicola*, n.sp. N

Siphonophoræ :

* *Anthemodes articulata*, n.sp. S

Crinoidea :

* *Antedon abyssicola*, n.sp. S N

Asteroidea :

* *Benthaster wyville-thomsoni*, n.g., n.sp. N
* *Brisinga discincta*, n.sp. S
* *Dytaster nobilis*, n.g., n.sp. S
* *Freyella benthophila*, n.sp. S
* „ *heroina*, n.sp. N
* *Hymenaster infernalis*, n.sp. N
* „ *pergamentaceus*, n.sp. S
* *Hyphalaster hyalinus*, n.g., n.sp. T
* *Pontaster pristinus*, n.g., n.sp. S
* *Porcellanaster eremicus*, n.g., n.sp. S

Ophiuroidea :

* *Amphiura dalea*, n.sp. S
* „ *verrilli*, n.sp. N
Ophiocten pallidum, n.sp. S
* „ *umbraticum*, n.sp. S
Ophioglypha bullata, n.sp. S N
„ *lacazei*, n.sp. S
„ *loveni*, n.sp. S
„ *ornata*, n.sp. S T
* „ sp. (?). S
Ophiomastus tegulitius, n.g., n.sp. S T

Echinoidea :

Aceste bellidifera, n.g., n.sp. S T N
Calymne relicta, n.g., n.sp. N
Phormosoma tenue, n.sp. T N
Pourtalesia laguncula, n.sp. S T N
* „ *rosea*, n.sp. T

Holothurioidea :

Benthodytes sanguinolenta, n.g., n.sp. S
* „ *selenkiana*, n.g., n.sp. T
* *Elpidia glacialis*, Théel. S
Holothuria thomsoni, n.sp. S N
Oneirophanta mutabilis, n.g., n.sp. S T N
* *Peniagone atrox*, n.g., n.sp. S
* „ *lugubris*, n.g., n.sp. T
Pseudostichopus villosus, n.g., n.sp. S T N
* *Psycheotrephes exigua*, n.g., n.sp. T
Psychropotes semperiana, n.g., n.sp. S T
* *Scotoanassa diaphana*, n.g., n.sp. S
* *Scotoplanes mollis*, n.g., n.sp. S
* „ *papillosa*, n.g., n.sp. S

Annelida :

Amphicteis gunneri (Sars), var. *atlantica*, nov. N
* „ *sarsi*, n.sp. S
Buskiella abyssorum, n.g., n.sp. S T
Ehlersiella atlantica, n.g., n.sp. N
* [*Œstrella levinseni*, n.g., n.sp., Crustacean parasite on the preceding]. N
* *Eunoa abyssorum*, n.sp. S
Eupista darwini, n.g., n.sp. S N
* „ *grubei*, n.g., n.sp. S
Lætmonice producta, Grube, var. *benthaliana*, nov. S T N

* *Lanassa benthaliana*, n.sp. N
* *Leæna abyssorum*, n.sp. N
Myriochele heeri, Malmgren. S T N
* ,, *pacifica*, n.sp. T
* *Placostegus benthalianus*, n.sp. N
,, *ornatus*, Sowerby. S N
* *Polynoë* (?) *ascidioides*, n.sp. S
* Tubes of form allied to *Eusamytha pacifica*, n.g., n.sp. N

OSTRACODA :

Cythere acanthoderma, n.sp. S T N
,, *dasyderma*, n.sp. S T N
,, *dictyon*, n.sp. S T N
* *Cytheropteron abyssorum*, n.sp. S
Krithe tumida, n.sp. S
Xestoleberis expansa, n.sp. S

CIRRIPEDIA :

Lepas anatifera, Linné (surface shell). N
* *Scalpellum planum*, n.sp. S
* ,, *regium*, n.sp. N

AMPHIPODA :

Cystisoma spinosum, Fabricius. S T N

ISOPODA :

* *Eurycope intermedia*, n.sp. N

PHYLLOCARIDA :

Nebaliopsis typica, n.g., n.sp. S

SCHIZOPODA :

Boreomysis obtusata, n.sp. N
* *Petalophthalmus armiger*, n.g., n.sp. T

MACRURA :

* *Acanthephyra kingsleyi*, n.sp. T
,, *purpurea*, M.-Edwards. N
Acanthephyra sica, n.sp. S T N
Benthesicymus crenatus, n.g., n.sp. T
Gennadas parvus, n.g., n.sp. S T N
Haliporus lævis, n.g., n.sp. T
* *Hemipenæus speciosus*, n.g., n.sp. S
* *Hepomadus inermis*, n.g., n.sp. S
Hymenodora glauca, n.sp. S T
,, *mollicutis*, n.sp. S T N
* *Pontophilus profundus*, n.sp. S
Sergestes profundus, n.sp. S

PYCNOGONIDA :

* *Colossendeis brevipes*, n.sp. S

LAMELLIBRANCHIATA :

* *Arca* (*Barbatia* ?) *imitata*, n.sp. N
,, (*Scapharca*) *inæquisculpta*, n.sp. T N
* *Callocardia* (?) *pacifica*, n.sp. N
* *Leda prolata*, n.sp. N
* ,, *ultima*, n.sp. N
* *Lima* (*Limatula*) sp. (?). T
* *Limopsis cristata*, Jeffreys. N
* *Malletia pallida*, n.sp. S
* *Neæra murrayi*, n.sp. N
Semele (*Abra*) *profundorum*, n.sp. T N
Silenia sarsii, n.g., n.sp. S
* *Yoldia hoylei*, n.sp. N

SCAPHOPODA AND GASTEROPODA :

* *Clathurella* (*Daphnella*) *monoceros*, n.sp. T
Dentalium leptoskeles, n.sp. S
* *Stylifer brychius*, n.sp. S

POLYZOA :

Bifaxaria abyssicola, n.g., n.sp. S N
* *Bugula johnstoniæ*, Gray. N

Bugula reticulata, n.sp. S T N
* *Cellepora solida*, n.sp. S
Cellularia crateriformis, n.sp. S
Cribrilina monoceros (Busk). S N
Farciminaria delicatissima, n.sp. T N
,, *magna*, n.sp. S
Kinetoskias cyathus, n.sp. S N
* *Phylactella* sp (?). N

Brachiopoda :

Terebratula wyvillii, n.sp. S T N

Tunicata :

* *Abyssascidia wyvillii*, n.g., n.sp. S
* *Bathyoncus minutus*, n.g., n.sp. N
* *Hypobythius calycodes*, n.g., n.sp. N
* *Pyrosoma* sp. (?) (surface). S
* *Styela bythia*, n.sp. S
* ,, *squamosa*, n.sp. S

Fishes :

Astronesthes niger, Rich. T
* *Bathyonus tænia*, n.sp. T
* *Bathypterois longicauda*, n.g., n.sp. S
* ,, *longipes*, n.g., n.sp. S
Chauliodus sloanii, Bl. Schn. T N
○ *Gonostoma microdon*, n.sp. S T N
* *Halosaurus rostratus*, n.sp. N
* *Idiacanthus ferox*, n.sp. N
○ *Macrurus filicauda*, n.sp. S
* *Mixonus laticeps*, n.g., n.sp. T
* *Nealotus tripes*, Johnson. N
○ *Nemichthys infans*, n.sp. T
Sternoptyx diaphana (Herm.). S T N

Notes on the Bathymetrical Distribution.—Of the species enumerated in the above list the following eleven species were taken at more than one Station in this zone; one of these (*Oneirophanta mutabilis*) was taken at three Stations, and another (*Gonostoma microdon*) at six Stations, the remaining nine each at two Stations.

Bathyactis symmetrica.
Antelon abyssicola.
Phormosoma tenue.
Oneirophanta mutabilis (3).
Pseudostichopus villosus.
Myriochele heeri.
Scalpellum regium.
Gennadas parvus.
Bugula reticulata.
Terebratula wyvillii.
Gonostoma microdon (6).

Of the 65 species noted in the above list as taken by the Challenger in the zone beyond 2500 fathoms, as well as in lesser depths (those without asterisks), the following 29 species (or 45 per cent.) were obtained in the zone between 2000 and 2500 fathoms :—

Stannoma coralloides.
,, *dendroides.*
Bathydorus fimbriatus.
Bathypathes patula.
Amphianthus ornatus.
Bathyactis symmetrica.
Ophioglypha lacazei.
,, *ornata.*
Benthodytes sanguinolenta.
Oneirophanta mutabilis.
Pseudostichopus villosus.
Buskiella abyssorum.
Eupista darwini.
Laimonice producta.
Placostegus ornatus.
Cythere dasyderma.
,, *dictyon.*
Benthesicymus crenatus.
Acanthephyra sica.
Gennadas parvus.

Hymenodora glauca.
„ *mollicutis.*
Bugula reticulata.
Farciminaria delicatissima.
Terebratula wyvillii.
Chauliodus sloanii.
Gonostoma microdon.
Macrurus filicauda.
Sternoptyx diaphana.

The following 37 species (or 58 per cent.) were taken in the zone between 1500 and 2000 fathoms :—

Holascus fibulatus.
Bathyactis symmetrica.
Monocaulus imperator.
Ophiocten pallidum.
Ophioglypha bullata.
„ *loveni.*
Aceste bellidifera.
Phormosoma tenue.
Benthodytes sanguinolenta.
Holothuria thomsoni.
Oneirophanta mutabilis.
Pseudostichopus villosus.
Psychropotes semperiana.
Amphicteis gunneri.
Buskiella abyssorum.
Lætmonice producta.
Cythere acanthoderma.
„ *dasyderma.*
„ *dictyon.*
Krithe tumida.
Xestoleberis expansa.
Cystisoma spinosum.
Acanthephyra purpurea.
Gennadas parvus.
Haliporus lævis.
Hymenodora mollicutis.
Semele (Abra) profundorum.
Silenia sarsii.
Dentalium leptoskeles.
Bugula reticulata.
Cellularia crateriformis.
Farciminaria delicatissima.
„ *magna.*
Kinetoskias cyathus.
Gonostoma microdon.
Macrurus filicauda.
Sternoptyx diaphana.

The following 25 species (or 39 per cent.) were taken in the zone between 1000 and 1500 fathoms :—

Holascus fibulatus.
Bathypathes patula.
Amphianthus ornatum.
Bathyactis symmetrica.
Ophioglypha bullata.
„ *loveni.*
Ophiomastus tegulitius.
Pourtalesia laguncula.
Oneirophanta mutabilis.
Pseudostichopus villosus.
Myriochele heeri.
Cythere acanthoderma.
„ *dasyderma.*
Cythere dictyon.
Cystisoma spinosum.
Nebaliopsis typica.
Acanthephyra sica.
Gennadas parvus.
Haliporus lævis.
Sergestes profundus.
Semele (Abra) profundorum.
Terebratula wyvillii.
Gonostoma microdon.
Macrurus filicauda.
Sternoptyx diaphana.

The following 17 species (or 27 per cent.) were taken in the zone between 500 and 1000 fathoms :—

Bathyactis symmetrica.
Aceste bellidifera.
Pourtalesia laguncula.
Ehlersiella atlantica.

Cythere acanthoderma.
,, *dasyderma.*
,, *dictyon.*
Cystisoma spinosum.
Acanthephyra sica.
Gennadas parvus.
Bifaxaria abyssicola.
Bugula reticulata.
Cribrilina monoceros.
Chauliodus sloanii.
Gonostoma microdon.
Nemichthys infans.
Sternoptyx diaphana.

The following 12 species (or 19 per cent.) were taken in the zone between 100 and 500 fathoms :—

Bathyactis symmetrica.
Ophiomastus tegulitius.
Pourtalesia lagunecula.
Cythere dasyderma.
,, *dictyon.*
Borcomysis obtusata.
Acanthephyra sica.
Gennadas parvus.
Arca (*Scapharca*) *inæquisculpta.*
Bugula reticulata.
Cribrilina monoceros.
Gonostoma microdon.

Thus four species (*Cythere dasyderma*, *Acanthephyra sica*, *Bugula reticulata*, and *Gonostoma microdon*) were taken in all the zones, except the shallow-water zone less than 100 fathoms.

The following 8 species (or 12 per cent.) were taken in depths less than 100 fathoms or at the surface :—

Bathyactis symmetrica.
Lætmonice producta.
Cythere dictyon.
Lepas anatifera.
Gennadas parvus (surface).
Cribrilina monoceros.
Astronesthes niger (surface).
Sternoptyx diaphana (surface).

Thus three species (*Bathyactis symmetrica*, *Cythere dictyon*, and *Gennadas parvus*) occur in all the zones of depth from the surface or shallow water to over 2500 fathoms.

Of the 96 species taken only in this zone beyond 2500 fathoms, 85 species (or 89 per cent.) are new, and the following 9 new genera were obtained only in this zone of depth :—

Stannarium (2).
Hyalostylus.
Trachycaulus.
Antheomorphe.
Halisiphonia.
Psycheotrephes.
Scotoanassa.
Petalophthalmus.
Mixonus.

These genera are each represented by a single species taken at a single station, except the genus *Stannarium*, which contains two species, each taken at a different Station inside this zone.

Notes on the Geographical Distribution.—An examination of the foregoing list shows that of the 161 species taken in this zone beyond 2500 fathoms, 87 species (or 54 per

cent.) were taken south of the southern tropic, 56 species (or 35 per cent.) were taken within the tropics, and 73 species (or 45 per cent.) were taken north of the northern tropic; while 18 species (or 11 per cent.) were found to be common to all those three areas, 8 species (or 5 per cent.) were common to both the northern and southern areas, 5 species (or 3 per cent.) were common to both the southern and tropical areas, and 6 species (or 4 per cent.) were common to both the tropical and northern areas.

2. Animals obtained in the Dredgings and Trawlings in Depths between 2000 and 2500 Fathoms.

The Challenger dredged or trawled at 32 Stations where the depth was between 2000 and 2500 fathoms, about 820 specimens of invertebrates and fishes being procured, belonging to about 340 species, representing about 250 genera. The total number of species and genera actually described and recorded in the Zoological Reports from the zone between these depths amounts to 262 species and 184 genera, of which 240 species (or 92 per cent. of the total number of species recorded in the Reports) and 82 genera (or 45 per cent.) are new to science, as shown in the following list. Those species taken by the Challenger in this zone only (numbering 165 species or 63 per cent.) are indicated by an asterisk thus.* The geographical distribution of the species is indicated by the heavy letters, S, T, and N, used to denote that the species was taken *south* of the tropic of Capricorn (S), *between* the tropics of Capricorn and Cancer (T), or *north* of the tropic of Cancer (N).

Deep-Sea Keratosa :

* *Ammoconia auloplegma*, n.g., n.sp. T
* *Ammolynthus prototypus*, n.g., n.sp. T
* *Ammosolenia rhizammina*, n.g., n.sp. T
* *Cerelasma gyrosphæra*, n.g., n.sp. T
* ,, *lamellosa*, n.g., n.sp. T
* *Psammopemma calcareum*, n.sp. T
* *Psammophyllum flustraceum*, n.g., n.sp. N
* ,, *reticulatum*, n.g., n.sp. T
Stannoma coralloides, n.g., n.sp. T
,, *dendroides*, n.g., n.sp. T
* *Stannophyllum globigerinum*, n.g., n.sp. T
* *Stannophyllum pertusum*, n.g., n.sp. T
* ,, *radiolarium*, n.g., n.sp. T
* ,, *venosum*, n.g., n.sp. T
* ,, *zonarium*, n.g., n.sp. T

Monaxonida :

* *Axinella profunda*, n.sp. T N
* *Axoniderma mirabile*, n.g., n.sp. S
* *Chondrocladia crinita*, n.sp. T
* *Cladorhiza abyssicola*, Sars, var. *linearis*, nov. T
* ,, *inversa*, n.sp. S
* ,, *similis*, n.sp. T
* *Esperella biserialis*, n.sp. S T

* *Suberites senilis*, n.sp. N
* *Tedania actiniiformis*, n.sp. S
* *Trichostemma irregularis*, n.sp. S

HEXACTINELLIDA :

* *Bathydorus baculifer*, n.g., n.sp. S
,, *fimbriatus*, n.g., n.sp. N
* *Caulocalyx tener*, n.g., n.sp. S
* *Caulophacus elegans*, n.g., n.sp. N
* ,, sp. (?). N
* *Dictyocalyx gracilis*, n.g., n.sp. T
* *Holascus ridleyi*, n.g., n.sp. T
* *Hyalonema divergens*, n.sp. T
* ,, *gracile*, n.sp. T
* ,, *robustum*, n.sp. N
* ,, (*Stylocalyx*) *depressum*, n.sp. T N
* ,, sp. (?). S
* ,, sp. (?). T
* ,, sp. (?). N
* *Malacosaccus unguiculatus*, n.g., n.sp. T
* Two Dictyonines undetermined. S

ALCYONARIA :

* *Bathygorgia profunda*, n.g., n.sp. N

PENNATULIDA :

* *Scleroptilum grandiflorum*, n.g., n.sp. N
* *Umbellula leptocaulis*, n.sp. T
* ,, *simplex*, n.sp. N
* ,, *thomsoni*, n.sp. N

ANTIPATHARIA :

* *Bathypathes alternata*, n.g., n.sp. N
* ,, *lyra*, n.g., n.sp. T N
,, *patula*, n.g., n.sp. T N

ACTINIARIA :

* *Amphianthus bathybium*, n.g., n.sp. N
Amphianthus ornatum, n.g., n.sp. N
* *Aulorchis paradoxa*, n.g., n.sp. S
Corallimorphus profundus, n.g., n.sp. S
,, *rigidus*, n.g., n.sp. S T
* *Epizoanthus thalamophilus*, n.sp. S
* *Ophiodiscus annulatus*, n.g., n.sp. S
* *Palythoa* (?) sp. S
* *Phellia* (?) sp. S
* *Polyopis striata*, n.g., n.sp. S
* Another Actinian undetermined. S

CORALS :

Bathyactis symmetrica (Pourtalès). S T N
Deltocyathus italicus, M.-Edwards and Haime. S T N
* *Leptopenus hypocælus*, n.g., n.sp. S

DEEP-SEA MEDUSÆ :

* *Æginura myosura*, n.g., n.sp. S
Atolla wyvillii, n.g., n.sp. S
* *Leonura terminalis*, n.sp. S
* *Tesserantha connectens*, n.g., n.sp. S

SIPHONOPHORÆ :

* *Disconalia gastroblasta*, n.g., n.sp. T

CRINOIDEA :

Hyocrinus bethellianus, n.g., n.sp. S T

ASTEROIDEA :

* *Dytaster biserialis*, n.g., n.sp. N
* ,, *inermis*, n.g., n.sp. T
* ,, *spinosus*, n.g., n.sp. N
* *Freyella attenuata*, n.sp. T
,, *echinata*, n.sp. T
* ,, *tuberculata*, n.sp. T
* *Hymenaster carnosus*, n.sp. S
* ,, *echinulatus*, n.sp. S
* ,, *geometricus*, n.sp. S

* *Hyphalaster diadematus*, n.g., n.sp. S
* *Lonchotaster tartareus*, n.g., n.sp. T
* *Marsipaster hirsutus*, n.g., n.sp. S
* ,, *spinosissimus*, n.g., n.sp. S
Pontaster venustus, n.g., n.sp. T N
* *Porcellanaster crassus*, n.g., n.sp. S
* ,, *gracilis*, n.g., n.sp. S
* *Styracaster horridus*, n.g., n.sp. T
* *Thoracaster cylindratus*, n.g., n.sp. T

Ophiuroidea :

* *Amphilepis papyracea*, n.sp. T
* ,, *patens*, n.sp. S
* *Amphiura cernua*, n.sp. N
Ophiacantha cosmica, n.sp. S T
* ,, *sentosa*, n.sp. S
* *Ophiochytra epigrus*, n.g., n.sp. T
* *Ophiocreas abyssicola*, n.sp. N
* *Ophioglypha convexa*, n.sp. T N
,, *lacazei*, n.sp. S
,, *minuta*, n.sp. S
,, *ornata*, n.sp. S T
Ophiomusium armigerum, n.sp. S T N

Echinoidea :

Aspidodiadema microtuberculatum, n.g., n.sp. S T
Cystechinus vesica, n.g., n.sp. S
,, *wyvillii*, n.g., n.sp. S
* *Homolampas fulva*, n.sp. T
* *Phormosoma asterias*, n.sp. S
Pourtalesia carinata, n.sp. S
,, *ceratopyga*, n.sp. S

Holothurioidea :

* *Achlyonice paradoxa*, n.g., n.sp. N
* *Benthodytes abyssicola*, n.g., n.sp. S
* ,, *mamillifera*, n.g., n.sp. S
,, *papillifera*, n.g., n.sp. S T
,, *sanguinolenta*, n.g., n.sp. S
Benthodytes sordida, n.g., n.sp. S
Cucumaria abyssorum, n.sp., var. *grandis*, nov. S
* *Deima fastosum*, n.g., n.sp. T
* ,, *validum*, n.g., n.sp. N
* *Elpidia rigida*, n.sp. N
* ,, *verrucosa*, n.sp. S
Oneirophanta mutabilis, n.g., n.sp. S T N
Pælopatides confundens, n.g., n.sp. S
* *Parelpidia cylindrica*, n.g., n.sp. S
* ,, *elongata*, n.g., n.sp. S
* *Peniagone wyvillii*, n.g., n.sp. T
Pseudostichopus villosus, n.g., n.sp. S T N
Psychropotes longicauda, n.g., n.sp. S
Scotoplanes globosa, n.g., n.sp. S
* *Synapta abyssicola*, n.sp. T
* *Trochostoma* sp. (?). S
* Holothurian closely resembling *Pseudostichopus villosus*, n.g., n.sp. S

Gephyrea :

Phascolosoma flagriferum, n.sp. N

Annelida :

Buskiella abyssorum, n.g., n.sp. S T
Eunoa opalina, n.sp. S
Eupista darwini, n.g., n.sp. S N
* *Eusamytha pacifica*, n.g., n.sp. N
* *Euthelepus chilensis*, n.g., n.sp. S
Lætmonice producta, Grube, var. *benthaliana*, nov. S T N
* *Lumbriconereis abyssorum*, n.sp. S
* *Maldanella valparaisiensis*, n.g., n.sp. S
* *Melinna pacifica*, n.sp. N
* *Nicomache* (?) *benthaliana*, n.sp. N
* *Nothria ehlersi*, n.sp. S
* ,, *pycnobranchiata*, n.sp. S

* *Placostegus mörchii*, n.sp. S
,, *ornatus*, Sowerby. S N
* *Samythopsis grubei*, n.g., n.sp. S

OSTRACODA :

* *Bairdia abyssicola*, n.sp. N
,, *minima*, n.sp. S N
Cythere acanthoderma, n.sp. S T N
* ,, *circumdentata*, n.sp. T N
,, *dasyderma*, n.sp. S T N
,, *dictyon*, n.sp. S T N
,, *suhmi*, n.sp. S N
Cytheropteron mucronalatum, n.sp. S T N

COPEPODA :

* *Lernæa abyssicola*, n.sp. (parasitic on *Ceratias uranoscopus*). T

CIRRIPEDIA :

* *Scalpellum abyssicola*, n.sp. N
* ,, *compressum*, n.sp. T
* ,, *darwinii*, n.sp. S
* ,, *gigas*, n.sp. N
* ,, *marginatum*, n.sp. T
* ,, *ornatum*, n.sp. T

AMPHIPODA :

* *Lanceola pacifica*, n.sp. N
* *Paradryope orguion*, n.g., n.sp. N

ISOPODA .

Arcturus abyssicola, n.sp. T
Bathytanais bathybrotes, n.g., n.sp. S N
* *Eurycope abyssicola*, n.sp. N
* *Ischnosoma thomsoni*, n.sp. N
* *Macrostylis latifrons*, n.sp. N
Serolis neæra, n.sp. (?). S
* *Typhlotanais brachyurus*, n.sp. N
,, *kerguelenensis*, n.sp. S N

CUMACEA :

* *Diastylis arenaceus*, n.sp. N
* ,, *mystacina*, n.sp. N
* *Leucon tenuirostris*, n.sp. N

SCHIZOPODA :

Gnathophausia gigas, n.g., n.sp. S N
* *Thysanopoda cristata*, n.sp. T

MACRURA :

Acanthephyra acutifrons, n.sp. T
,, *brachytelsonis*, n.sp. S T N
* ,, *longidens*, n.sp. S T
,, *sica*, n.sp. S T N
Aristeus armatus, n.sp. S T N
Benthesicymus brasiliensis, n.g., n.sp. S T
,, *crenatus*, n.g., n.sp. T
Gennadas parvus, n.g., n.sp. S T N
* *Haliporus curvirostris*, n.g., n.sp. S T
Hemipenæus spinidorsalis, n.g., n.sp. S T
Hymenodora glauca, n.sp. S T
,, *mollicutis*, n.sp. S T N
* *Nematocarcinus altus*, n.sp. T
* *Notostomus patentissimus*, n.sp. T
* ,, *perlatus*, n.sp. T
Petalidium foliaceum, n.g., n.sp. S
Pontophilus gracilis, n.sp. S T
Sergestes atlanticus, M.-Edwards. S T N
* *Tropiocaris planipes*, n.g., n.sp. N
Willemœsia leptodactyla, n.g., n.sp. S T

ANOMURA :

Parapagurus abyssorum, M.-Edwards var. *scabra*, nov. S T N
* *Tylaspis anomala*, n.g., n.sp. S

PYCNOGONIDA :

* *Colossendeis media*, n.sp. S

* *Nymphon longicollum*, n.sp. S
* ,, *procerum*, n.sp. S

LAMELLIBRANCHIATA :

Arca (*Barbatia*) *corpulenta*, n.sp. S T
,, (,,) *pteroessa*, n.sp. T N
* *Callocardia adamsii*, n.sp. T
* *Nucula profundorum*, n.sp. N
* *Sarepta abyssicola*, n.sp. T N

SCAPHOPODA AND GASTEROPODA :

* *Basilissa lampra*, n.g., n.sp. N
* *Cithna margaritifera*, n.sp. N
Dentalium acutissimum, n.sp. T N
* ,, *keras*, n.sp. S N
* *Pleurotoma* (*Surcula*) *rotundata*, n.sp. N
* *Trochus* (*Bembix*) *abyssorum*, n.sp. N

POLYPLACOPHORA :

* *Leptochiton benthus*, n.sp. N

NUDIBRANCHIATA :

* *Bathydoris abyssorum*, n.g., n.sp. T

CEPHALOPODA :

Cirroteuthis magna, n.sp. S
* ,, *pacifica*, n.sp. T
Eledone rotunda, n.sp. S
Enoploteuthis margaritifera, Rüppel. T
* *Histiopsis atlantica*, n.g., n.sp. S
Spirula peronii, Lamarck (surface ?). T
Taonius suhmi, n.sp. (surface ?). S N

POLYZOA :

Bicellaria naviculoris, n.sp. S T
Bifaxaria reticulata, n.g., n.sp. T
Bugula margaritifera, n.sp. S
* ,, *mirabilis*, n.sp. T
,, *reticulata*, n.sp. S T N
Farciminaria delicatissima, n.sp. T N
* ,, *pacifica*, n.sp. N
Flustra biseriata, n.sp. S T
Kinetoskias pocillum, n.sp. S T
* *Menipea pateriformis*, n.sp. S

BRACHIOPODA :

Discina atlantica, King. S T N
Terebratula wyvillii, n.sp. S T N
* *Waldheimia wyvillii*, n.sp. S

TUNICATA :

* *Bathyoncus discoideus*, n.g., n.sp. N
* *Corynascidia suhmi*, n.g., n.sp. S
* *Culeolus moseleyi*, n.g., n.sp. T
* ,, *murrayi*, n.g., n.sp. N
* ,, *willemoesi*, n.g., n.sp. N
* *Octacnemus bythius*, n.g., n.sp. S T
Pyrosoma giganteum (Lesueur), (surface ?). S T
,, *spinosum*, n.sp. (surface ?). S N
* *Styela pusilla*, n.sp. N

FISHES :

* *Bathylagus atlanticus*, n.g., n.sp. S
* *Bathysaurus mollis*, n.g., n.sp. T N
* *Bathytroctes macrolepis*, n.g., n.sp. T
* *Ceratias uranoscopus*, n.sp. T
Chauliodus sloanii, Bl. Schn. T N
Gonostoma gracile, n.sp. N
,, *microdon*, n.sp. S T N
Ipnops murrayi, n.g., n.sp. S T
Lepidopus tenuis, n.sp. (surface ?). N
Macrurus armatus, Hector. S T N
,, *filicauda*, n.sp. S
,, *liocephalus*, n.sp. N
* *Malacosarcus macrostoma*, n.g., n.sp. T
Melanocetus murrayi, n.sp. T

* *Opostomias micripnus*, n.g., n.sp. S
* *Pachystomias microdon*, n.g., n.sp. T
* *Porogadus rostratus*, n.sp. T
Sternoptyx diaphana (Herm.). S T N
Synaphobranchus bathybius, n.sp. S N
* *Typhlonus nasus*, n.g., n.sp. T

Notes on the Bathymetrical Distribution.—Of the species enumerated in the above list 39 species (or 15 per cent.) were taken at more than one Station (when taken at more than two Stations the number of times is indicated within brackets after the name), viz. :—

Axinella profunda.
Esperella biserialis.
Hyalonema (Stylocalyx) depressum.
Bathypathes lyra.
Bathyactis symmetrica (4).
Freyella tuberculata.
Ophiacantha cosmica.
Ophioglypha convexa (3).
Ophiomusium armigerum.
Aspidodiadema microtuberculatum (3).
Cystechinus vesica.
Pourtalesia ceratopyga.
Benthodytes mamillifera.
Cucumaria abyssorum.
Oneirophanta mutabilis (3).
Pelopatides confundens.
Holothurian (?).
Nothria elaersi.
„ *pycnobranchiata.*
Cythere circumdentata.
Cythere dasyderma (3).
„ *-dictyon.*
Acantliephyra longidens.
„ *sica* (4).
Aristeus armatus (3).
Bentliesicymus brasiliensis.
Gennadas parvus (3).
Haliporus curvirostris.
Arca (Barbatia) corpulenta (3).
„ („) *pteroessa.*
Sarepta abyssicola.
Dentalium keras.
Bugula reticulata.
Farciminaria delicatissima.
Discina atlantica.
Gonostoma microdon (4).
Macrurus armatus.
Malacosarcus macrostoma.
Typhlonus nasus.

Of the 97 species taken in this zone between 2000 and 2500 fathoms, as well as in deeper or shallower zones (those without asterisks), 29 species (or 30 per cent.) were taken in the zone beyond 2500 fathoms, a list of which has already been given (see pp. 1280, 1281).

The following 52 species (or 54 per cent.) were taken in the zone between 1500 and 2000 fathoms :—

Bathyactis symmetrica.
Atolla wyrillii.
Hyocrinus bethellianus.
Freyella echinata.
Ophiacantha cosmica.
Ophioglypha minuta.
Ophiomusium armigerum.
Aspidodiadema microtuberculatum.
Cystechinus vesica.
„ *wyrillii*
Pourtalesia carinata.
„ *ceratopyga.*
Benthodytes sanguinolenta.
„ *sordida.*
Cucumaria abyssorum.
Oneirophanta mutabilis.
Pseudostichopus villosus.
Psychropotes longicauda.
Scotoplanes globosa.
Phascolosoma flagriferum.

Buskiella abyssorum.
Lætmonice producta.
Cythere acanthoderma.
„ *dasyderma.*
„ *dictyon.*
Cytheropteron mucronalatum.
Gnathophausia gigas.
Acanthephyra sica.
Aristeus armatus.
Benthesicymus brasiliensis.
Gennadas parvus.
Hemipenæus spinidorsalis.
Hymenodora mollicutis.
Pontophilus gracilis.
Willemœsia leptodactyla.
Parapagurus abyssorum.
Arca (Barbatia) pteroessa.
Eledone rotunda.
Bifaxaria reticulata.
Bugula margaritifera.
„ *reticulata.*
Farciminaria delicatissima.
Discina atlantica.
Pyrosoma spinosum.
Bathysaurus mollis.
Gonostoma microdon.
Ipnops murrayi.
Macrurus armatus.
„ *filicauda.*
„ *liocephalus.*
Melanocetus murrayi.
Sternoptyx diaphana.
Synaphobranchus bathybius.

The following 42 species (or 43 per cent.) were taken in the zone between 1000 and 1500 fathoms:—

Bathypathes patula.
Amphianthus ornatum.
Corallimorphus profundus.
„ *rigidus.*
Bathyactis symmetrica.
Deltocyathus italicus.
Freyella echinata.
Ophiacantha cosmica.
Ophioglypha minuta.
Cystechinus wyvillii.
Benthodytes papillifera.
Cucumaria abyssorum.
Oneirophanta mutabilis.
Pælopatides confundens.
Pseudostichopus villosus.
Cythere acanthoderma.
„ *dasyderma.*
„ *dictyon.*
Cytheropteron mucronalatum.
Arcturus abyssicola.
Acanthephyra sica.
Aristeus armatus.
Benthesicymus brasiliensis.
Gennadas parvus.
Petalidium foliaceum.
Pontophilus gracilis.
Willemœsia leptodactyla.
Parapagurus abyssorum.
Arca (Barbatia) corpulenta.
Dentalium acutissimum.
Cirroteuthis magna.
Enoploteuthis margaritifera.
Bugula reticulata.
Discina atlantica.
Terebratula wyvillii.
Corynascidia suhmi.
Octacnemus bythius.
Gonostoma microdon.
Macrurus armatus.
„ *filicauda.*
Sternoptyx diaphana.
Synaphobranchus bathybius.

The following 18 species (or 19 per cent.) were taken in the zone between 500 and 1000 fathoms:—

Bathyactis symmetrica.
Deltocyathus italicus.
Pontaster venustus.
Ophiacantha cosmica.
Cythere acanthoderma.
„ *dasyderma.*
„ *dictyon.*
Serolis neæra.

Acanthephyra acutifrons.
„ *brachytelsonis.*
„ *sica.*
Gennadas parvus.
Sergestes atlanticus.
Bugula reticulata.
Flustra biseriata.
Chauliodus sloanii.
Gonostoma microdon.
Sternoptyx diaphana.

The following 25 species (or 26 per cent.) were taken in the zone between 100 and 500 fathoms :—

Bathyactis symmetrica.
Deltocyathus italicus.
Ophiacantha cosmica.
Aspidodiadema microtuberculatum.
Ennoa opalina.
Cythere dasyderma.
„ *dictyon.*
„ *suhmi.*
Typhlotanais kerguelenensis.
Acanthephyra brachytelsonis.
„ *sica.*
Benthesicymus brasiliensis.
Gennadas parvus.
Sergestes atlanticus.
Arca (*Barbatia*) *corpulenta.*
„ („) *pteroessa*
Spirula peronii.
Bicellaria naviculoris.
Bugula reticulata.
Kinetoskias pocillum.
Discina atlantica.
Gonostoma gracile.
„ *microdon.*
Lepidopus tenuis.
Macrurus armatus.

The following 12 species (or 12 per cent.) were taken in depths less than 100 fathoms or at the surface :—

Bathyactis symmetrica.
Pontaster venustus.
Lætmonice producta.
Bairdia minima.
Cythere dictyon.
Bathytanais bathybrotes.
Gennadas parvus (surface).
Sergestes atlanticus (surface).
Parapagurus abyssorum.
Taonius suhmi (surface).
Pyrosoma giganteum (surface).
Sternoptyx diaphana (surface).

Of the 166 species taken only in this zone between 2000 and 2500 fathoms, 154 species (or 93 per cent.) are new to science, and the following 23 new genera were obtained only in this zone of depth :—

Ammosolenia.
Stannophyllum (5).
Azamiderma.
Caulocalyx.
Dictyocalyx.
Bathygorgia.
Aulocchis.
Polyopis.
Ægineura.
Tesserantha.
Ophiochytra.
Deima (2).
Parelpidia (2).
Eusamytha.
Samythopsis.
Paradyopc.
Tylaspis.
Bathyploris.
Histiopsis.
Malacosarcus.
Opostomias.
Pachystomias.
Typhlonus.

Twenty of these genera are each represented by a single species, two others (*Deima* and *Parelpidia*) each by two species taken at separate Stations within the zone, while the remaining one (*Stannophyllum*) contains five species all taken at one Station.

Notes on the Geographical Distribution.—An examination of the foregoing list shows that of the 262 species taken in this zone between 2000 and 2500 fathoms, 133 species (or 51 per cent.) were taken south of the southern tropic, 122 species (or 47 per cent.) were taken within the tropics, and 99 species (or 38 per cent.) were taken north of the northern tropic; while 23 species (or 9 per cent.) were found to be common to all those three areas, 11 species (or 4 per cent.) were common to the southern and northern areas, 22 species (or 8 per cent.) were common to the southern and tropical areas, and 13 species (or 5 per cent.) were common to the tropical and northern areas.

3. Animals obtained in the Dredgings and Trawlings in Depths between 1500 and 2000 Fathoms.

The Challenger dredged or trawled at 32 Stations where the depth was between 1500 and 2000 fathoms, about 1250 specimens of invertebrates and fishes being procured, belonging to about 500 species and about 345 genera. The total number of species and genera actually described and recorded in the Zoological Reports from the zone between these depths amounts to 412 species, of which 348 (or 84 per cent.) are new to science, belonging to 272 genera, of which 105 (or 39 per cent.) are new to science, as shown in the following list. Those species taken by the Challenger in this zone only (numbering 249 species, or 60 per cent.) are indicated by an asterisk thus.* The geographical distribution of the species is indicated by the heavy letters S, T, and N, used to denote that the species was taken *south* of the tropic of Capricorn (S), *between* the tropics of Capricorn and Cancer (T), or *north* of the tropic of Cancer (N).

Deep-Sea Keratosa:

* *Holopsamma cretaceum*, n.sp. N
* *Psammina plakina*, n.g., n.sp. S

Monaxonida:

Axinella erecta (Carter). S
* *Cladorhiza moruliformis*, n.sp. S
* ,, (?) *tridentata*, n.sp. S
* *Esperella mammiformis*, n.sp. S
* *Esperiopsis profunda*, n.sp. S
* *Meliiderma stipitata*, n.g., n.sp. S
Stylocordyla stipitata (Carter). S T N

Tetractinellida:

* *Thenea delicata*, n.sp. S
* *Thenea fenestrata* (Schmidt). T
* ,, sp. (?). S

Hexactinellida:

Aulocalyx irregularis, n.g., n.sp. S
* *Balanella pipetta*, n.g., n.sp. S
* *Bathydorus spinosus*, n.g., n.sp. S
* *Caulophacus latus*, n.g., n.sp. S
Euplectella suberea, n.sp. T N
* *Farrea* sp. (?). S
Holascus fibulatus, n.g., n.sp. S
* ,, *polejaevii*, n.g., n.sp. S
* *Hyalonema conus*, n.sp. S
* ,, *tenue*, n.sp. S

* *Hyalonema* (*Stylocalyx*) *clavigerum*, n.sp. S
* *Pheronema carpenteri* (Wyville Thomson). T
* *Poliopogon amadou*, n.g., n.sp. N
* *Polyrhabdus oviformis*, n.g., n.sp. S

ALCYONARIA :

* *Acanella arbuscula* (Johnson). N
* *Anthomastus canariensis*, n.sp. N
* *Callozostron mirabilis*, n.g., n.sp. S
* *Dasygorgia japonica*, n.sp. N
Pleurocorallium johnsoni, Gray. N
* *Stenella dæderleini*, n.sp. N
* *Strophogorgia fragilis*, n.g., n.sp. N
„ *verrilli*, n.g., n.sp. N
* *Telesto rigida*, n.sp. N

PENNATULIDA :

* *Anthoptilum simplex*, n.g., n.sp. S
Protoptilum aberrans, n.sp. N
* *Umbellula carpenteri*, n.sp. S
* „ *güntheri*, n.sp. T
„ *magniflora*, n.sp. S

ANTIPATHARIA :

* *Schizopathes crassa*, n.g., n.sp. S

ACTINIARIA :

* *Bunodes minuta*, n.sp. S
* *Cereus spinosus*, n.sp. S N
* *Corallimorphus obtectus*, n.g., n.sp. S
Liponema multiporum, n.g., n.sp. S N
* *Paractis* (?) *tubulifera*, n.sp. N
* *Polystomidium patens*, n.g., n.sp. S
* *Porponia robusta*, n.g., n.sp. N
* *Sicyonis crassa*, n.g., n.sp. S
* *Tealidium cingulatum*, n.g., n.sp. S
* Actinian undetermined. S

CORALS :

Bathyactis symmetrica (Pourtalès). S T N
* *Caryophyllia berteriana*, Duchassaing. N
Cryptohelia pudica, M.-Edwards and Haime. S T N
* *Leptopenus discus*, n.g., n.sp. S

HYDROIDA :

Monocaulus imperator, n.sp. N
Stephanoscyphus simplex, Allman, MS., n.sp. S

DEEP-SEA MEDUSÆ :

Atolla wyvillii, n.g., n.sp. S
* *Periphema regina*, n.g., n.sp. S
* *Thamnostylus dinema*, n.g., n.sp. S

SIPHONOPHORÆ :

* *Bathyphysa gigantea*, n.sp. S
* *Disconalia pectyllis*, n.g., n.sp. S
* *Salacia polygastrica*, n.g., n.sp. T

CRINOIDEA :

* *Antedon abyssorum*, n.sp. S
* „ *bispinosa*, n.sp. S
* „ *remota*, n.sp. S
Bathycrinus aldrichianus, n.sp. S
* „ *campbellianus*, n.sp. T
Hyocrinus bethellianus, n.g., n.sp. S T
* *Promachocrinus abyssorum*, n.g., n.sp. S
Rhizocrinus lofotensis, Sars. S T
* *Thaumatocrinus renovatus*, n.g., n.sp. S

ASTEROIDEA :

* *Brisinga armillata*, n.sp. N
„ *membranacea*, n.sp. S
* *Chitonaster cataphractus*, n.g., n.sp. S
* *Colpaster scutigerula*, n.g., n.sp. N

Dytaster exilis, n.g., n.sp., var. *carinata*, nov. S N
,, ,, var. *gracilis*, nov.
,, *madreporifer*, n.g., n.sp. N
Freyella fragilissima, n.sp. S
* ,, *pennata*, n.sp. N
* *Hymenaster cælatus*, n.sp. S
* ,, *crucifer*, n sp. S
* ,, *formosus*, n.sp. S
* ,, *latebrosus*, n.sp. S
* ,, *nobilis*, n.sp. S
,, *præcoquis*, n.sp. S
* ,, *sacculatus*, n.sp. S
* *Hyphalaster inermis*, n.g., n.sp. N
* ,, *planus*, n.g., n.sp. S
* *Lonchotaster forcipifer*, n.g., n.sp. S
* *Nymphaster protentus*, n.g., n.sp. N
* *Paragonaster cylindratus*, n.sp. T
* *Pararchaster antarctica*, n.g., n.sp. S
* ,, *pedicifer*, n.g., n.sp. S
,, *semisquamatus*, n.g., n.sp. N
,, ,, var. *occidentalis*, nov.
Phoxaster pumilus, n.g., n.sp. N
Plutonaster rigidus, n.g., n.sp. N
Pontaster forcipatus, n.g., n.sp. S N
Porania antarctica, Smith. S
* *Porcellanaster tuberosus*, n.g., n.sp. N
* *Psilaster gracilis*, n.g., n.sp. N
* *Pythonaster murrayi*, n.g., n.sp. S
* *Styracaster armatus*, n.g., n.sp. T

Ophiuroidea :

* *Amphilepis tenuis*, n.sp. N
* *Amphiura patula*, n.sp. S
Ophiacantha cosmica, n.sp. S T
* ,, *nodosa*, n.sp. N
Ophiernus vallincola, n.g., n.sp. S N
Ophiocten amitinum, n.sp. S
Ophiocten pallidum, n.sp. S
* *Ophiocymbium cavernosum*, n.g., n.sp. S
Ophioglypha bullata, n.sp. S N
* ,, *fraterna*, n.sp. S
* ,, *inornata*, n.sp. T
,, *irrorata*, n.sp. S
* ,, *lienosa*, n.sp. S
,, *loveni*, n.sp. S
,, *minuta*, n.sp. S
* ,, *orbiculata*, n.sp. N
* ,, *sculptilis*, n.sp. N
* ,, *undulata*, n.sp. T
Ophiolebes scorteus, n.g., n.sp. S
* *Ophiomitra carduus*, n.sp. N
,, *chelys*, n.sp. N
* ,, (?) sp. N
* *Ophiomusium archaster*, n.sp. S
,, *armigerum*, n.sp. S T N
* ,, *corticosum*, n.sp. T
* ,, *granosum*, n.sp. N
,, *lymani*, Wyville Thomson. S T N
,, *pulchellum*, n.sp. S T N
* *Ophioplinthus grisea*, n.g., n.sp. S
* ,, *medusa*, n.g., n.sp. S
* *Ophiotholia supplicans*, n.g., n.sp. S

Echinoidea :

Aceste bellidifera, n.g., n.sp. S T N
Aspidodiadema microtuberculatum, n.g., n.sp. S T
,, *tonsum*, n.g., n.sp. S T
Cystechinus clypeatus, n.g., n.sp. S T
,, *vesica*, n.g., n.sp. S
,, *wyvillii*, n.g., n.sp. S
* *Echinocrepis cuneata*, n.g., n.sp. S
Echinus magellanicus, Phil. S
* *Genicopatagus affinis*, n.g., n.sp. S

Goniocidaris canaliculata, Agassiz. S
Phormosoma tenue, n.sp. T N
,, *uranus*, n.sp. N
Pourtalesia carinata, n.sp. S
,, *ceratopyga*, n.sp. S
* ,, *hispida*, n.sp. S
* ,, *phiale*, Wyville Thomson. S
Salenia hastigera, n.sp. S T N
,, *varispina*, Agassiz. T N
* *Spatagocystis challengeri*, n.g., n.sp. S
Urechinus naresianus, n.g., n.sp. S

HOLOTHURIOIDEA :

* *Achlyonice lactea*, n.g., n.sp. S
Benthodytes sanguinolenta, n.g., n.sp., var. *marginata*, nov. S
,, *sordida*, n.g., n.sp. S
Cucumaria abyssorum, n.sp. S
,, ,, var. *hyalina*, nov.
* *Elpidia ambigua*, n.sp. S
* ,, *purpurea*, n.sp. S
* ,, *willemöesi*, n.sp. S
Holothuria thomsoni, n.sp. S N
,, ,, var. *hyalina*, nov.
Lætmogone wyville-thomsoni, n.g., n.sp. S N
Oneirophanta mutabilis, n.g., n.sp. S T N
* *Peniagone affinis*, n.g., n.sp. S
* ,, *horrifer*, n.g., n.sp. S
Pseudostichopus villosus, n.g., n.sp. S T N
,, ,, var. *violaceus*, nov.
Psychropotes longicauda, n.g., n.sp. S
,, ,, var. *fusco-purpurea*, nov.
Psychropotes longicauda, var. *monstrosa*, nov.
,, *semperiana*, n.g., n.sp. S T
* *Scotoplanes albida*, n.g., n.sp. S
,, *globosa*, n.g., n.sp. S
* ,, *robusta*, n.g., n.sp. S

ENTOZOA :

* *Ascaris macruroidei*, n.sp. (parasitic on Macrurid). S
* *Protkelmins profundissima*, n.g., n.sp. S

NEMERTEA :

Pelagonemertes rollestoni, n.g., n.sp. (surface). S N

GEPHYREA :

* *Phascolion lutense*, n.sp. S
* *Phascolosoma catharinæ*, Müller. S
,, *flagriferum*, n.sp. N

ANNELIDA :

Amphicteis gunneri (Sars). N
,, *wyvillei*, n.sp. S
Buskiella abyssorum, n.g., n.sp. S T
* *Chloenea atlantica*, n.sp. N
* *Dalhousia atlantica*, n.g., n.sp. N
* *Ephesia antarctica*, n.sp. S
* *Evarne tenuisetis*, n.sp. N
* *Grubianella antarctica*, n.g., n.sp. S
Hyalinæcia benthaliana, n.sp. S
Lætmonice producta, Grube, var. *benthaliana*, nov. S T N
,, ,, var. *willemoesi*, nov.
,, ,, var. *wyvillei*, nov.
* *Lagisca crosetensis*, n.sp. S
* ,, (*Agnodice*) *moseleyi*, n.sp. T

* *Leæna antarctica*, n.sp. S
* *Maldane malmgreni*, n.sp. N
Maldanella antarctica, n.g. n.sp. S
* *Melinnopsis atlantica*, n.g., n.sp. N
* *Nereis longisetis*, n.sp. N
Nothria abranchiata, n.sp. S
* „ *armandi*, n.sp. S
* *Petta assimilis*, n.sp. S
* *Pista abyssicola*, n.sp. S
* *Polynoë* (*Robertianella*) *synophthalma*, n.sp. T N
* *Praxilla abyssorum*, n.sp. S
* *Trophonia wyvillei*, n.sp. S

Myzostomida :

* *Stelechopus hyocrini*, n.g., n.sp. (parasitic on *Hyocrinus*). S

Ostracoda :

Argillæcia eburnea, n.sp. S
* *Bairdia bosqueticana*, Brady. S
„ *hirsuta*, n.sp. S
Cythere acanthoderma, n.sp. S T N
„ *dasyderma*, n.sp. S T N
„ *dictyon*, n.sp. S T N
„ *normani*, Brady. S
* „ *squalidentata*, n.sp. S
Cytheropteron mucronalatum, n.sp. S T N
Krithe producta, n.sp. S T N
„ *tumida*, n.sp. S
Macrocypris similis, n.sp. S T
Pseudocythere caudata, Sars. S
Xestoleberis expansa, n.sp. S

Cirripedia :

* *Scalpellum antarcticum*, n.sp. S
„ *brevicarinatum*, n.sp. S
* „ *improvisum*, n.sp., MS. S
* *Scalpellum insigne*, n.sp. N
* „ *vitreum*, n.sp. N
* *Verruca obliqua*, n.sp. N
* „ *quadrangularis*, n.sp. S

Amphipoda :

Andania gigantea, n.sp. S
Cystisoma spinosum (Fabricius). S T N
Lanceola æstiva, n.sp. T
* „ *australis*, n.sp. S
* „ sp. (?). S
* *Orchomene abyssorum*, n.sp. S
* *Phronima novæ-zealandiæ*, Powell. S
* *Pleustes abyssorum*, n.sp. S
* *Stenopleura atlantica*, n.g., n.sp. (surface ?). S T
* *Valettia coheres*, n.g., n.sp. S

Isopoda :

* *Acanthocope spinicauda*, n.g., n.sp. S
* *Arcturus brunneus*, n.sp. S
„ *furcatus*, Studer. S
* „ *glacialis*, n.sp. S
Eurycope fragilis, n.sp. S N
„ *sarsii*, n.sp. S
* „ *spinosa*, n.sp. S
* „ sp. (?). S
* *Iolanthe acanthonotus*, n.g., n.sp. S
* *Munnopsis australis*, n.sp. S
Neotanais americanus, n.g., n.sp. S N
Serolis antarctica, n.sp. S T
„ *bromleyana*, n.sp. S

Schizopoda :

* *Amblyops crozetii*, n.sp. S
Bentheuphausia amblyops, n.g., n.sp. S T
* *Boreomysis scyphops*, Sars. S
* *Chalaraspis alata*, n.g., n.sp. S T
Eucopia australis, Dana. S T N

* *Gnathophausia affinis*, n.g., n.sp. T
,, *gigas*, n.g., n.sp. S N
* ,, *gracilis*, n.g., n.sp. T
,, *zoëa*, n.g., n.sp. S T N
Pseudomma sarsii, n.sp. S

MACRURA :

* *Acanthephyra acanthitelsonis*, n.sp. T
* ,, *brevirostris*, n.sp. T
,, *purpurea*, M.-Edwards. N
Aristeus armatus, n.sp. S T N
* *Benthocaris stylorostratis*, n.g., n.sp. T
Benthesicymus altus, n.g., n.sp. S T N
,, *brasiliensis*, n.g., n.sp. S T
* ,, *iridescens*, n.g., n.sp. S
* ,, *mollis*, n.g., n.sp. S
* *Eryonicus cæcus*, n.g., n.sp. N
Gennadas intermedius, n.g., n.sp. S T
,, *parvus*, n.g., n.sp. S T N
Glyphocrangon rimapes, n.sp. S N
Hemipenæus spinidorsalis, n.g., n.sp. S T
Haliporus lævis, n.g., n.sp. T
* *Hepomadus glacialis*, n.g., n.sp. N
* *Hymenodora duplex*, n.sp. S
,, *mollicutis*, n.sp. S T N
* *Nematocarcinus longirostris*, n.sp. N
* ,, *parridentatus*, n.sp. N
,, *productus*, n.sp. T N
,, *proximatus*, n.sp. S T N
* *Notostomus murrayi*, n.sp. S
Pontophilus gracilis, n.sp. S T
Willemœsia leptodactyla, n.g., n.sp. S T

ANOMURA :

Munidopsis antonii (M.-Edwards, MS.). S
,, *subsquamosa*, n.sp. S N
Parapagurus abyssorum, M.-Edwards. S T N

BRACHYURA :

* *Ethusa* (*Ethusina*) *challengeri*, n.sp. N

PYCNOGONIDA :

Colossendeis gigas, n.sp. S
* ,, *gigas-leptorhynchus*, n.sp. S
,, *gracilis*, n.sp. S
,, *leptorhynchus*, n.sp. S
Nymphon hamatum, n.sp. S
* ,, *meridionale*, n.sp. S
* *Phoxichilidium mollissimum*, n.sp. N
* ,, *oscitans*, n.sp. N
* ,, *pilosum*, n.sp. S

LAMELLIBRANCHIATA :

Amussium meridionale, n.sp. S
Arca (*Barbatia*) *pteroessa*, n.sp. T N
* *Cryptodon moseleyi*, n.sp. S
* *Cuspidaria* (*Myonera*) *lischkei*, n.sp. N
* *Glomus japonicus*, n.sp. N
* ,, *nitens*, Jeffreys. S
* *Kellia* (?) sp. S
* *Leda excisa* (Philippi). N
* ,, n.sp. (?). S
* *Lima* (*Limatula*), n.sp. (?). S
* ,, (?) sp. S
Limopsis pelagica, n.sp. T N
* *Lyonsiella grandis*, n.sp. S
* ,, *jeffreysi*, n.sp. T
* ,, *papyracea*, n.sp. T
* *Malletia dunkeri*, n.sp. N
* *Modiolaria semigranata* (Reeves). N
* *Neæra filocarinata*, n.sp. T
* ,, *meridionalis*, n.sp. S
Semele (*Abra*) *profundorum*, n.sp. T N
Silenia sarsii, n.g., n.sp. S
* *Verticordia tornata* (Jeffreys). T N

Scaphopoda and Gasteropoda :

* *Basilissa simplex*, n.g., n.sp. S
* *Clathurella homæotata*, n.sp. T
* ,, *phyxanor*, n.sp. T
* *Columbella* sp. (?). N
* *Dentalium amphialum*, n.sp. S
,, *leptoskeles*, n.sp. S
* ,, n.sp. (?). T
* *Fusus* (*Neptunea*) *calathiscus*, n.sp. S
,, (,,) *setosus*, n.sp. S
* *Guivillea alabastrina*, n.g., n.sp. S
Ianthina exigua, Lamarck (surface). T N
,, *rotundata*, Leach (surface). S N
* *Oocorys sulcata*, Fischer. T
* *Pleurotoma* (*Bela*) *climakis*, n.sp. T
* ,, (*Mangelia*) sp. (?). N
* ,, (*Pleurotomella*) *brychia*, n.sp. T
* ,, (,,) *papyracea*, n.sp. S
* *Pleurotoma* (*Spirotropis*) *aganactica*, n.sp. S
* ,, (*Surcula*) *lepta*, n.sp. S
* *Trochus* sp. (?). S

Cephalopoda :

* *Bathyteuthis abyssicola*, n.g., n.sp. S
* *Cranchia* (*Liocranchia*) *reinhardtii*, Steenstrup (surface ?). T
Eledone rotunda, n.sp. S
* *Mastigoteuthis agassizii*, Verrill. N
Octopus januarii, Steenstrup, MS. N
* *Promachoteuthis megaptera*, n.g., n.sp. N

Polyzoa :

* *Bicellaria infundibulata*, n.sp. S
* *Bifaxaria minuta*, n.g., n.sp. N
,, *reticulata*, n.g., n.sp. T
* *Bugula bicornis*, n.sp. S
* ,, *leontodon*, n.sp. N
,, *margaritifera*, n.sp. S
,, *reticulata*, n.sp. S T N
,, ,, var. *unicornis*, nov.
* *Canda simplex*, n.sp. N
* *Catenaria bicornis*, n.sp. T
Cellularia crateriformis, n.sp. S
* *Farciminaria cribraria*, n.sp. S
,, *delicatissima*, n.sp. T N
,, *gracilis*, n.sp. T N
,, *magna*, n.sp. S
,, ,, var. *armata*, nov.
* *Foveolaria orbicularis*, n.g., n.sp. S
Idmonea marionensis, Busk. S
Kinetoskias cyathus, n.sp. S N
* *Menipea clausa*, n.sp. N
* *Nellia simplex*, Busk. N
Onchopora sinclairii, Busk. S
Salicornaria magnifica, n.sp. S T
Tessaradoma boreale (Busk). T

Brachiopoda :

Discina atlantica, King. S T N
* *Megerlia* (?) *incerta*, n.sp. T
* *Terebratula* (or *Terebratulina*) *dalli*, n.sp. N
* ,, sp. (?). T

Tunicata :

* *Abyssascidia vasculosa*, n.g., n.sp. S
* *Bathyoncus mirabilis*, n.g., n.sp. S
* *Culeolus perlatus*, n.g., n.sp. N
* ,, *perlucidus*, n.g., n.sp. S
* *Fungulus cinereus*, n.g., n.sp. S
* *Pharyngodictyon mirabile*, n.g., n.sp. S
* *Pyrosoma spinosum*, n.sp. (surface). S N
* *Styela sericata* n.sp. S

Fishes:

* *Bathylagus antarcticus*, n.g., n.sp. S
Bathyonus compressus, n.sp. T
Bathysaurus mollis, n.g., n.sp. T N
* *Chiasmodus niger*, Johnson. T
* *Cyema atrum*, n.g., n.sp. S
Gonostoma microdon, n.sp. S T N
Ipnops murrayi, n.g., n.sp. S T
* *Macrurus affinis*, n.sp. S
,, *altipinnus*, n.sp. N
,, *armatus*, Hector. S T N
* ,, *asper*, n.sp. N
,, *filicauda*, n.sp. S
Macrurus liocephalus, n.sp. N
Melamphaës crassiceps, n.sp. S T
* ,, *robustus*, n.sp. T
Melanocetus murrayi, n.sp. T
* *Melanonus gracilis*, n.g., n.sp. S
* *Neobythites grandis*, n.sp. N
* *Notacanthus rissoanus*, Filippi and Vérany. N
* *Platytroctes apus*, n.g., n.sp. T
* *Scopelus antarcticus*, n.sp. S
Sternoptyx diaphana (Herm.). S T N
* *Stomias boa* (Risso). S
Synaphobranchus bathybius, n.sp. S N

Notes on the Bathymetrical Distribution.—Of the species enumerated in the above list 61 species (or 15 per cent.) were taken at more than one Station (when taken at more than two Stations the number of times is indicated within brackets after the name), viz. :—

Thenea fenestrata.
Umbellula carpenteri.
Cereus spinosus.
Liponema multiporum.
Bathyactis symmetrica (4).
Leptopenus discus (3).
Hyocrinus bethellianus.
Promachocrinus abyssorum.
Lonchotaster forcipifer.
Pararchaster pedicifer.
Ophiacantha cosmica (5).
Ophioglypha loveni (3).
Ophiomusium armigerum.
Cystechinus clypeatus.
,, *wyvillii* (3).
Goniocidaris canaliculata (3).
Pourtalesia carinata.
,, *hispida.*
Salenia hastigera.
Spatagocystis challengeri.
Urechinus narcissianus.
Benthodytes sordida (3).
Cucumaria abyssorum.
Elpidia purpurea.
Laetmogone wyrille-thomsoni.
Psychropotes longicauda.
Pseudostichopus villosus (4).
Phascolion lutense.
Grubianella antarctica (3).
Lælmonice producta.
Polynoë (*Robertianella*) *synophthalma.*
Cythere dasyderma.
,, *dictyon* (4).
Cytheropteron mucronalatum (3).
Krithe producta.
Cystisoma spinosum.
Stenopleura atlantica.
Eurycope fragilis (3).
Bentheuphausia amblyops.
Boreomysis scyphops (3).
Eucopia australis (4).
Acanthephyra acanthitelsonis.
,, *purpurea.*
Aristeus armatus (3).
Glyphocrangon rimapes.
Hymenodora mollicutis (4).
Willemœsia leptodactyla.
Parapagurus abyssorum.
Phoxichilidium pilosum.
Arca (*Barbatia*) *pteroessa.*
Verticordia tornata.
Bicellaria infundibulata.

Salicornaria magnifica (3)
Discina atlantica.
Cyema atrum.
Gonostoma microdon (3).
Ipnops murrayi.
Macrurus armatus (3).
„ *filicauda* (3).
Scopelus antarcticus.
Sternoptyx diaphana.

The majority of these were taken at two Stations, while 14 were taken at three Stations, 5 at four Stations, and 1 at five Stations.

Of the 163 species taken in this zone between 1500 and 2000 fathoms, as well as in deeper or shallower zones (those without asterisks), 37 species (or 23 per cent.) were taken in the zone beyond 2500 fathoms, and 52 species (or 32 per cent.) in the zone between 2000 and 2500 fathoms; lists of these have already been given (see pp. 1281 and 1288–9).

The following 85 species (or 52 per cent.) were taken in the zone between 1000 and 1500 fathoms :—

Aulocalyx irregularis.
Euplectella suberea.
Holascus fibulatus.
Pleurocorallium johnsoni.
Protoptilum aberrans.
Umbellula magniflora.
Bathyactis symmetrica.
Bathycrinus aldrichianus.
Brisinga membranacea.
Dytaster exilis.
„ *madreporifer.*
Freyella fragilissima.
Hymenaster præcoquis.
Phoxaster pumilus.
Pontaster forcipatus.
Ophiacantha cosmica.
Ophiernus vatlincola.
Ophiocten amitinum.
Ophioglypha bullata.
„ *loveni.*
„ *minuta.*
Ophiomitra chelys.
Ophiomusium tymani.
Cystechinus clypeatus.
„ *wyvillii.*
Phormosoma uranus.
Salenia hastigera.
„ *varispina.*
Urechinus naresianus.
Cucumaria abyssorum.
Lætmogone wyville-thomsoni.
Oneirophanta mutabilis.
Pseudostichopus villosus.
Hyalinœcia benthaliana.
Lætmonice producta.
Maldanella antarctica.
Nothria abranchiata.
Bairdia hirsuta.
Cythere acanthoderma.
„ *dasyderma.*
„ *dictyon.*
Cytheropteron mucronalatum.
Krithe producta.
Scalpellum brevicarinatum.
Andania gigantea.
Cystisoma spinosum.
Eurycope fragilis.
„ *sarsii.*
Neotanais americanus.
Serolis antarctica.
„ *bromleyana.*
Beutheuphausia amblyops.
Eucopia australis.
Gnathophausia zoëa.
Aristeus armatus.
Benthesicymus altus.
„ *brasiliensis.*
Gennadas parvus.
Glyphocrangon rimapes.
Haliporus lævis.

Nematocarcinus productus.
„ *proximatus.*
Pontophilus gracilis.
Willemœsia leptodactyla.
Munidopsis antonii.
„ *subsquamosa.*
Parapagurus abyssorum.
Colossendeis gigas.
„ *gracilis.*
„ *leptorhynchus.*
Nymphon hamatum.
Amussium meridionale.
Arca (Barbatia) pterœssa.
Semele (Abra) profundorum.
Fusus (Neptunea) setosus.
Iauthina exigua.
„ *rotundata.*
Discina atlantica.
Bathyonus compressus.
Gonostoma microdon.
Macrurus armatus.
„ *filicauda.*
Melamphaës crassiceps.
Sternoptyx diaphana.
Synaphobranchus bathybius.

The following 30 species (or 18 per cent.) were taken in the zone between 500 and 1000 fathoms :—

Axinella erecta.
Euplectella suberea.
Strophogorgia verrilli.
Bathyactis symmetrica.
Cryptohelia pudica.
Pararchaster semisquamatus.
Ophiacantha cosmica.
Ophiomusium lymani.
Acesta bellidifera.
Aspidodiadema tenuum.
Salenia hastigera.
Pelagonemertes rollestoni.
Latmonice producta.
Cythere acanthoderma.
„ *dasyderma.*
Cythere dictyon.
Krithe producta.
Cystisoma spinosum.
Lanceola æstiva.
Serolis bromleyana.
Gnathophausia zoëa.
Benthesicymus altus.
Gennadas parvus.
Ianthina exigua.
Bugula reticulata.
Idmonea marionensis.
Gonostoma microdon.
Macrurus altipinnus.
Melamphaës crassiceps.
Sternoptyx diaphana.

The following 51 species (or 31 per cent.) were taken in the zone between 100 and 500 fathoms :—

Axinella erecta.
Stylocordyla stipitata.
Aulocalyx irregularis.
Lipomema multiporum.
Bathyactis symmetrica.
Cryptohelia pudica.
Rhizocrinus lofotensis.
Porania antarctica.
Ophiacantha cosmica.
Ophiocten amitinum.
Ophioglypha irrorata.
Ophiolebes scorteus.
Ophiomastra chelys.
Ophiomusium lymani.
„ *pulchellum.*
Aspidodiadema microtuberculatum.
Echinus magellanicus.
Goniocidaris caualiculata.
Salenia hastigera.
„ *varispina.*
Latmogone wyville-thomsoni.
Latmonice producta.
Argillœcia eburnea.
Cythere dasyderma.
„ *dictyon.*
„ *norvani.*

Krithe producta.
Macrocypris similis.
Pseudocythere caudata.
Arcturus furcatus.
Serolis antarctica.
„ *bromleyana.*
Pseudomma sarsii.
Benthesicymus altus.
„ *brasiliensis.*
Gennadas parvus.
Nematocarcinus productus.
Colossendeis leptorhynchus.
Arca (Barbatia) pteroessa.
Limopsis pelagica.
Ianthina exigua.
Octopus januarii.
Bugula reticulata.
Farciminaria gracilis.
Idmonea marionensis.
Onchopora sinclairii.
Salicornaria magnifica.
Tessaradoma boreale.
Discina atlantica.
Gonostoma microdon.
Macrurus armatus.

The following 18 species (or 10 per cent.) were taken in depths less than 100 fathoms or at the surface :—

Stylocordyla stipitata.
Bathyactis symmetrica.
Aspidodiadema tonsum.
Echinus magellanicus.
Goniocidaris canaliculata.
Salenia hastigera.
Lætmonice producta.
Argillæcia eburnea.
Cythere dictyon.
Arcturus furcatus.
Gennadas intermedius (surface).
„ *parvus* (surface).
Nematocarcinus proximatus.
Parapagurus abyssorum.
Ianthina rotundata (surface).
Idmonea marionensis.
Onchopora sinclairii.
Sternoptyx diaphana (surface).

Of the 249 species taken only in this zone between 1500 and 2000 fathoms, 212 species (or 85 per cent.) are new to science, and the following 35 new genera were obtained only in this zone :—

Meliiderma.
Balanella.
Polyrhabdus.
Callozostron.
Polystomidium.
Tealidium.
Periphema.
Thamnostylus.
Chitonaster.
Colpaster.
Pythonaster.
Ophiocymbium.
Ophioplinthus (2).
Ophiotholia.
Echinocrepis.
Genicopatagus.
Spatagocystis.
Prothelmins.
Dalhousia.
Grubianella.
Melinnopsis.
Stelechopus.
Stenopleura.
Valettia.
Iolanthe.
Chalaraspis.
Eryoneicus.
Guivillea.
Promachoteuthis.
Fungulus.
Pharyngodictyon.
Cyema.
Melanonus
Platytroctes.

Except the genus *Ophioplinthus* (which contains two species), these are all represented by a single species.

Notes on the Geographical Distribution.—An examination of the foregoing list shows that of the 412 species taken in this zone between 1500 and 2000 fathoms, 274 species (or 67 per cent.) were taken south of the southern tropic, 101 species (or 25 per cent.) were taken within the tropics, and 137 species (or 33 per cent.) were taken north of the northern tropic; while 30 species (or 7 per cent.) were found to be common to all those three areas, 18 species (or 4 per cent.) were common to the southern and northern areas, 13 species (or 3 per cent.) were common to the tropical and northern areas, and 20 species (or 5 per cent.) were common to the southern and tropical areas.

4. Animals obtained in the Dredgings and Trawlings in Depths between 1000 and 1500 Fathoms.

The Challenger dredged or trawled at 25 Stations where the depth was between 1000 and 1500 fathoms, about 2000 specimens being procured, belonging to about 600 species and about 400 genera. The total number of species and genera actually described and recorded in the Zoological Reports from the zone between these depths amounts to 508 species and 327 genera, of which 365 species (or 72 per cent.) and 83 genera (or 25 per cent.) are new to science, as shown in the following list. Those species taken by the Challenger in this zone only (numbering 277 species, or 55 per cent.) are indicated by an asterisk thus.* The geographical distribution of the species is indicated by the heavy letters S, T, and N, used to denote that the species was taken *south* of the tropic of Capricorn (S), *between* the tropics of Capricorn and Cancer (T), or *north* of the tropic of Cancer (N).

Deep-Sea Keratosa:

* *Psammina globigerina*, n.g., n.sp. T

Monaxonida:

Phakellia ventilabrum (Johnston), var. *connexira*, nov. S T
Rhizochalina fistulosa (Bowerbank). N
Tentorium semisuberites (Schmidt). S N
* *Trichostemma sarsii*, n.sp. T N

Tetractinellida:

Azorica pfeifferæ, Carter. T N
* *Isops pachydermata*, n.sp. N
* *Tetilla sandalina*, n.sp. N
Thenea schmidtii, n.n. T N
* ,, *wrightii*, n.sp. S
* ,, sp. (?). T

Hexactinellida:

Aphrocallistes bocagei, Wright. T N
Aulocalyx irregularis, n.g., n.sp. S
Chonelasma lamella, n.g., n.sp. S N
* ,, sp. (?). N
Dactylocalyx (?) *patella*, n.sp. N
* *Euplectella nodosa*, n.sp. N
,, *suberea*, n.sp. T N
* *Farrea* sp. (?). S
Holascus fibulatus, n.g., n.sp. S
* *Hyalonema poculum*, n.sp. S
* ,, (*Stylocalyx*) *thomsoni*, Marshall, var. *exiguum*, nov. N
* ,, , two species undetermined. T

Lefroyella decora, n.g., n.sp. N
* *Malacosaccus vastus*, n.g., n.sp. S
* *Rhabdodictyum delicatum*, Schmidt. N

ALCYONARIA :

* *Acanella simplex*, Verrill. N
* *Ceratoisis palmæ*, n.sp. N
* *Clavularia elongata*, n.sp. N
Pleurocorallium johnsoni, Gray. N
* *Sympodium armatum*, n.sp. N

PENNATULIDA :

* *Anthoptilum murrayi*, n.g., n.sp. N
Protoptilum aberrans, n.sp. N
Umbellula magniflora, n.sp. S

ANTIPATHARIA :

Bathypathes patula, n.g., n.sp. T N
,, ,, var. *plenispina*, nov.
* *Schizopathes affinis*, n.g., n.sp. T

ACTINIARIA :

Amphianthus ornatum, n.g., n.sp. N
Corallimorphus profundus, n.g., n.sp. S
,, *rigidus* n.g., n.sp. S T
* *Edwardsia* sp. (?). S
* *Ophiodiscus sulcatus*, n.g., n.sp. S
* *Paractis excavata*, n.sp. S
* *Phellia* sp. (?) S
* *Stephanactis abyssicola*, n.g., n.sp. N
* Actinian undetermined. T

CORALS :

Bathyactis symmetrica (Pourtalès). S T N
Caryophyllia communis (Seguenza). S N
Deltocyathus italicus, M.-Edwards and Haime. S T N
* *Flabellum alabastrum*, n.sp. N
* ,, *angulare*, n.sp. N
* *Flabellum conuis*, n.sp. T
Solenosmilia variabilis, Duncan. S T
Stephanotrochus diadema, n.g., n.sp. T N
* ,, *nobilis*, n.g., n.sp. N

HYDROIDA :

* *Cryptolaria humilis*, n.sp. N

DEEP-SEA MEDUSÆ :

* *Nauphanta challengeri*, n.g., n.sp. S
* *Pectis antarctica*, n.g., n.sp. S
* *Pectyllis arctica*, Haeckel. N
* *Periphylla mirabilis*, n.sp. S
* *Ptychogena pinnulata*, Haeckel. N

CRINOIDEA :

* *Antedon acutiradia*, n.sp. T
,, *alternata*, n.sp. S T N
,, *basicurva*, n.sp. S T
,, *breviradia*, n.sp. S T
,, *inæqualis*, n.sp. S T
Bathycrinus aldrichianus, n.sp. S
* *Eudiocrinus varians*, n.g., n.sp. T
Pentacrinus naresianus, n.sp. S T

ASTEROIDEA :

* *Aphroditaster gracilis*, n.g., n.sp. N
* *Asterias* (*Hydrasterias*) *ophidion*, n.sp. N
* *Benthaster penicillatus*, n.g., n.sp. T
Brisinga membranacea, n.sp. S
* ,, *verticillata*, n.sp. N
Cribrella oculata (Linck), Forbes. N
Dytaster exilis, n.g., n.sp. S N
,, *madreporifer*, n.g., n.sp. N
* *Freyella bracteata*, n.sp. N
* ,, *dimorpha*, n.sp. T
,, *echinata*, n.sp. T
,, *fragilissima*, n.sp. S
* *Hymenaster anomalus*, n.sp. S

* *Hymenaster coccinatus*, n.sp. S
* ,, *graniferus*, n.sp. S
* ,, *membranaceus*, n.sp. N
* ,, *porosissimus*, n.sp. S
,, *præcoquis*, n.sp. S
* ,, *pullatus*, n.sp. T
* ,, *vicarius*, n.sp. S
Leptoptychaster arcticus (Sars), var. *elongata*, nov. N
Neomorphaster eustichus, n.g., n.sp. N
Pararchaster armatus, n.g., n.sp. N
* *Pentagonaster lepidus*, n.sp. N
Phoxaster pumilus, n.g., n.sp. N
* *Plutonaster abbreviatus*, n.g., n.sp. N
* ,, *bifrons* (Wyville Thomson). N
* ,, *notatus*, n.g., n.sp. N
* ,, *rigidus*, n.g., n.sp., var. *semiarmata*, nov. N
Pontaster forcipatus, n.g., n.sp. S N
* ,, *trullipes*, n.g., n.sp. T
* *Porcellanaster cæruleus*, n.g., n.sp. N
Zoroaster fulgens, Wyville Thomson. T N
* ,, *tenuis*, n.sp. T

Ophiuroidea :

Amphilepis norvegica, Ljungman. N
Amphiura concolor, n.sp. T
* ,, *duplicata*, Lyman. N
,, *otteri*, Ljungman. N
Ophiacantha bidentata (Retzius), Ljungman. N
,, *cosmica*, n.sp. S T
* ,, *placentigera*, n.sp. T
,, *segesta*, n.sp. N
* *Ophiactis canotia*, n.sp. N
,, *poa*, n.sp. S
* *Ophiambix aculeatus*, n.g., n.sp. T
Ophiernus vallincola, n.g., n.sp. S N
Ophiocten amitinum, n.sp. S
* *Ophiocten hastatum*, n.sp. S N
Ophiogeron edentulus, n.g., n.sp. T N
* *Ophioglypha æqualis*, n.sp. T
,, *bullata*, n.sp. S N
,, *jejuna*, n.sp. S
,, *lepida*, Lyman. T N
,, *loveni*, n.sp. S
,, *meridionalis*, n.sp. S
,, *minuta*, n.sp. S
* ,, *radiata*, n.sp. T
,, *variabilis*, n.sp. T
* *Ophiohelus pellucidus*, n.g., n.sp. T
Ophiomastus tegulitius, n.g., n.sp. S T
Ophiomitra chelys, n.sp. N
,, *plicata*, n.sp. S T
* ,, *sarsii*, n.sp. S
Ophiomusium lymani, Wyville Thomson. S T N
* *Ophiomyces grandis*, n.sp. S
* *Ophiophyllum* sp. (?). S
* *Ophiothamnus* sp. (?). S
* ,, or *Ophiacantha* sp. (?). T
* *Ophiotrochus panniculus*, n.g., n.sp. T
Ophiozona stellata, n.sp. S

Echinoidea :

Asthenosoma gracile, n.sp. S T
Brissopsis luzonica (Gray). S T N
Cystechinus clypeatus, n.g., n.sp. S T
,, *wyvillii*, n.g., n.sp. S
Echinus acutus, Lamarck. S T N
,, *elegans* (Düben and Koren). S T N
,, *norvegicus*, Düben and Koren. S N
Phormosoma bursarium, n.sp. T N
,, *hoplacantha*, n.sp. S N
,, *luculentum*, n.sp. T
,, *uranus*, n.sp. N

* *Podocidaris prionigera*, n.sp. T
Pourtalesia laguncula, n.sp. S T N
Prionechinus sagittiger, n.g., n.sp. S T
Salenia hastigera, n.sp. S T N
,, *varispina*, Agassiz. T N
Schizaster moseleyi, n.sp. S
Urechinus naresianus, n.g., n.sp. S

Holothurioidea :
Benthodytes papillifera, n.g., n.sp. S T
* ,, *typica*, n.g., n.sp. N
Cucumaria abyssorum, n.sp. S
,, ,, var. *hyalina*, nov.
* *Elpidia incerta*, n.sp. S
* *Enypniastes eximia*, n.g., n.sp. S
* *Euphronides depressa*, n.g., n.sp. S N
Holothuria lactea, n.sp. S N
,, *murrayi*, n.sp. S T N
* *Kolga nana*, n.sp. S N
Lætmogone wyville-thomsoni, n.g., n.sp. S N
Oneirophanta mutabilis, n.g., n.sp. S T N
Pælopatides confundens, n.g., n.sp. S
* *Peniagone vitrea*, n.g., n.sp. S
Pseudostichopus villosus, n.g., n.sp. S T N
* *Psychropotes loveni*, n.g., n.sp. S
* *Scotoplanes murrayi*, n.g., n.sp. S
* *Stichopus* (?) *torvus*, n.sp. S
Trochostoma albicans, n.sp. S N
* Two Holothurians undetermined. S
* One ,, ,, T
* One ,, ,, N

Nemertea :
* *Carinina grata*, n.g., n.sp. N
Cerebratulus angusticeps, n.sp. S

Gephyrea :
* *Bonellia suhmii*, n.sp. N
* *Phascolion botulus*, n.sp. T

Annelida :
Aricia norvegica, Sars. T N
* *Aricidea fragilis*, Webster. N
* *Chætozone benthaliana*, n.sp. N
* *Eumenia reticulata*, n.sp. S
Eunice ærstedi, Stimpson. S N
* *Harmothoë benthaliana*, n.sp. N
Hyalinœcia benthaliana, n.sp. S
Lætmonice producta, Grube, var. *willemoesi*, nov. S T N
* *Laranda longa* (Webster). N
* *Leæna langerhansi*, n.sp. S
* ,, *neo-zealaniæ*, n.sp. S
Leanira hystricis, Ehlers. N
* *Lumbriconereis ehlersii*, n.sp., var. *tenuisetis*, nov. N
* ,, *punctata*, n.sp. N
* *Maldane* sp. (?). N
Maldanella antarctica, n.g., n.sp. S
* ,, *neo-zealaniæ*, n.g., n.sp. S
* *Melinna armandi*, n.sp. S
Myriochele heeri, Malmgren. S T N
* *Nephthys phyllobranchia*, n.sp. N
Nothria abranchiata (= *abyssicola*), n.sp. S
Notomastus agassizii, n.sp. T N
* *Polynoë* (*Admetella*) *longipedata*, n.sp. S
* *Praxilla occidentalis*, n.sp. N
* *Serpula philippinensis*, n.sp. T
* *Spiochætopterus* (?) sp., tubes. N
* *Staurocephalus atlanticus*, n.sp. N
Terebellides strœmi, Sars. S N
* *Thelepus* (?) sp. N
Vermilia (?) sp. S

Myzostomida :
* *Myzostoma compressum*, n.sp. (parasitic on *Bathycrinus*). S

* *Myzostoma coronatum*, n.sp. (parasitic on *Bathycrinus*). S

Ostracoda :

* *Bairdia acanthigera*, Brady. T
* ,, *exaltata*, n.sp. T
,, *foveolata*, Brady. S T N
,, *hirsuta*, n.sp. S
* ,, *milne-edwardsi*, Brady. T
,, *victrix*, Brady. S T N
* *Bythocypris elongata*, n.g., n.sp. S
* *Crossophorus imperator*, n.g., n.sp. S
* *Cypridina gracilis*, n.sp. N
Cythere acanthoderma, n.sp. S T N
,, *dasyderma*, n.sp. S T N
,, *dictyon*, n.sp. S T N
* ,, *dorsoserrata*, n.sp. S
* ,, *irpex*, n.sp. S N
,, *scutigera*, Brady. S T
,, (?) *serratula*, n.sp. S T N
,, *speyeri*, Brady. T
,, *stolonifera*, n.sp. S
* ,, *sulcato-perforata*, n.sp. S
* ,, *viminea*, n.sp. S
Cytheropteron fenestratum, n.sp. S
,, *mucronalatum*, n.sp. S T N
Krithe producta, n.sp. S T N
Xestoleberis curta, Brady. S T N
,, *variegata*, n.sp. T

Copepoda :

* *Calanus princeps*, n.sp. N

Cirripedia :

* *Dichelaspis sessilis*, n.sp. N
Scalpellum acutum, n.sp. S N
* ,, *australicum*, n.sp. T
,, *brevicarinatum*, n.sp. S
* ,, *carinatum*, n.sp. S
* *Scalpellum distinctum*, n.sp. T
* ,, *dubium*, n.sp. T
* ,, *eximium*, n.sp. S
* ,, *flavum*, n.sp. S
* ,, *minutum*, n.sp. S
* ,, *moluccanum*, n.sp. T
* ,, *tenue*, n.sp. S
* ,, *truncatum*, n.sp. T
,, *velutinum*, n.sp. S N
* *Verruca gibbosa*, n.sp. S
* ,, *incerta*, n.sp. S

Amphipoda :

* *Amaryllis haswelli*, n.sp. N
* *Amathyllopsis australis*, n.sp. T
* *Andania abyssorum*, n.sp. S
,, *gigantea*, n.sp. S
* *Camacho bathyplous*, n.g., n.sp. S
Cyphocaris micronyx, n.sp. S
Cystisoma spinosum (Fabricius). S T N
Elasmopus subcarinata (Haswell). S
* *Gammaropsis thomsoni*, n.sp. S
* *Lanceola suhmi*, n.sp. N
* *Leucothoë tridens*, n.sp. S
* *Œdiceroides cinderella*, n.g., n.sp. S
* *Onesimoides carinatus*, n.g., n.sp. T
* *Platamon longimanus*, n.g., n.sp. N
* *Podocerus hoeki*, n.sp. S

Isopoda :

* *Acanthocope acutispina*, n.g., n.sp. S
Acanthomunna proteus, n.g., n.sp. S
* *Anuropus branchiatus*, n.g., n.sp. T
Arcturus abyssicola, n.sp. T
* ,, *spinosus*, n.sp. S
* *Cymodocea abyssorum*, n.sp. T
Eurycope fragilis, n.sp. S N
* ,, *novæ-zelandiæ*, n.sp. S
* ,, *pellucida*, n.sp. T

Eurycope sarsii, n.sp. S
* *Ischnosoma bacilloides*, n.sp. S
* ,, *spinosum*, n.sp. N
* *Janira abyssicola*, n.sp. T
* *Leiopus leptodactylus*, n.g., n.sp. N
* *Munnopsis gracilis*, n.sp. S
Neotanais americanus, n.g., n.sp. S N
Serolis antarctica, n.sp. S T
,, *bromleyana*, n.sp. S
* ,, sp. (?). S

PHYLLOCARIDA :

Nebaliopsis typica, n.g., n.sp. S

CUMACEA :

* *Diastylis stygia*, Sars. N
* *Eudorella abyssi*, n.sp. N

SCHIZOPODA :

Bentheuphausia amblyops, n.g., n.sp. S T
* *Boreomysis microps*, n.sp. N
Eucopia australis, Dana. S T N
* *Gnathophausia willemoesii*, n.g., n.sp. T
,, *zoëa*, n.g., n.sp. S T N

MACRURA :

Acanthephyra sica, n.sp. S T N
Aristeus armatus, n.sp. S T N
Benthesicymus altus, n.g., n.sp. S T N
,, *brasiliensis*, n.g., n.sp. S T
,, *pleocanthus*, n.g., n.sp. T
* *Dorodotes reflexus*, n.g., n.sp. T
Gennadas parvus, n.g., n.sp. S T N
* *Glyphocrangon acuminata*, n.sp. T
* ,, *granulosis*, n.sp. T
* ,, *podager*, n.sp. S
,, *rimapes*, n.sp. S N
Haliporus lævis, n.g., n.sp. T
Hymenodora rostrata, n.sp. T N
* *Nematocarcinus intermedius*, n.sp. T
* ,, *lanceopes*, n.sp. S
,, *productus*, n.sp. T N
,, *proximatus*, n.sp. S T N
,, *tenuipes*, n.sp. T N
Notostomus longirostris, n.sp. T
Oplophorus typus, M.-Edwards. T
* *Orphania tenuimana*, n.g., n.sp. N
* *Paraxius altus*, n.g., n.sp. T
Penæus serratus, n.sp. T
,, *velutinus*, Dana. T N
Pentacheles lævis, n.g., n.sp. S T
* ,, *obscura*, n.g., n.sp. T
Petalidium foliaceum, n.g., n.sp. S
Polycheles helleri, n.sp. S T
Pontophilus gracilis, n.sp. S T
Sergestes profundus, n.sp. S
* *Stochasmus exilis*, n.g., n.sp. N
* *Tropiocaris tenuipes*, n.g., n.sp. T
Willemœsia leptodactyla, n.g., n.sp. S T

ANOMURA :

* *Elasmonotus latifrons*, n.sp. T
* ,, *marginatus*, n.sp. S
* *Galacantha bellis*, n.sp. S
* ,, *talismanii*, M.-Edwards. T
* *Lithodes agassizii*, Smith. N
Munidopsis antonii, (M.-Edwards, MS.). S
,, *brevimana*, n.sp. T
* ,, *serratifrons*, M.-Edwards. N
,, *subsquamosa*, n.sp., var. *aculeata*, nov. S N
* *Pagurodes inarmatus*, n.g., n.sp. S
* ,, (?) sp. N
Parapagurus abyssorum, M.-Edwards. S T N

BRACHYURA :

* *Ethusa microphthalma*, Smith. N

Ethusa (*Ethusina*) *gracilipes*, n.sp., var. *robusta*, nov. T

PYCNOGONIDA :

* *Ascorhynchus glaber*, n.sp. S
Colossendeis gigas, n.sp. S
,, *gracilis*, n.sp. S
,, *leptorhynchus*, n.sp. S
* ,, *minuta*, n.sp. N
* *Nymphon compactum*, n.sp. S
,, *hamatum*, n.sp. S
* ,, *longicoxa*, n.sp. S

LAMELLIBRANCHIATA :

Amussium cancellatum, n.sp. T N
,, *lucidum* (Jeffreys). T N
,, *meridionale*, n.sp. S
* ,, *propinquum*, n.sp. N
* ,, *watsoni*, n.sp. T
Arca (*Barbatia*) *corpulenta*, n.sp. S T
,, (,,) *pteroessa*, n.sp. T N
* *Callocardia* (?) *atlantica*, n.sp. N
Cryptodon croulinensis (Jeffreys). N
* ,, *luzonicus*, n.sp. T
* *Dacrydium vitreum* (Möller). N
Ervilia castanea (Montagu). N
* *Leda confinis*, n.sp. N
,, *jeffreysi*, Hidalgo. T N
Lima multicostata, Sowerby. S T N
,, (*Limatula*) *confusa*, n.sp. T N
* ,, (,,) *subovata*, Jeffreys. N
* ,, (,,) sp. (?). S
Limopsis aurita (Brocchi). T N
* *Lucina* (*Codakia*) *tigerina* (Linné). N
* *Malletia obtusa*, Sars. N
* *Montacuta cylindracea*, n.sp. N
* *Myrina coppingeri*, n.sp. T
* *Neæra azorica*, n.sp. N
* ,, *circinata*, Jeffreys. N
* *Neæra obesa*, Lovén. N
* ,, *wollastonii*, n.sp. N
* *Nucula reticulata*, Jeffreys. N
* *Pecten murrayi*, n.sp. T
,, *pudicus*, n.sp. S
Semele (*Abra*) *profundorum*, n.sp. T N
* *Teredo* sp. (?). T
Venus (*Chamelæa*) *mesodesma*, Quoy and Gaimard. S
* *Verticordia quadrata*, n.sp. N

SCAPHOPODA AND GASTEROPODA :

* *Actæon amabilis*, n.sp. N
* ,, *globulinus* (Forbes). N
* ,, (*Acteonina*) *chariis*, n.sp. N
* ,, sp. (?). N
* *Addisonia excentrica* (Tiberi). N
* *Aporrhais*, n.sp. (?). T
* *Basilissa munda*, n.g., n.sp. N
* ,, *superba*, n.g., n.sp. T
* *Bellerophina* sp. (?). N
* *Buccinum* (?) *aquilarum*, n.sp. N
Bulla semilevis, Seguenza. N
Cadulus gracilis, Jeffreys. N
* ,, *tumidosus*, Jeffreys. N
* *Cæcum* sp. (?). N
Cassis sp. (?). N
* ,, , three species, fry. N
Cithna tenella (Jeffreys). T N
* *Clathurella cala*, n.sp. S
,, *chariessa*, n.sp. T N
* ,, *chyta*, n.sp. N
,, *formosa* (Jeffreys). T N
* ,, *streptophora*, n.sp. N
* ,, , two species undetermined. N
* *Clionella quadruplex*, n.sp. N
* *Columbella* sp. (?). N
Cylichna ovata, Jeffreys. T N
Dentalium acutissimum, n.sp. T N

Dentalium capillosum, Jeffreys. T N
– ,, *circumcinctum*, n.sp. T N
,, *subterfissum*, Jeffreys. T N
* *Dunkeria falcifera*, n.sp. N
– *Fenella elongata*, n.sp. T N
* *Fossarus cereus*, n.sp. T
– *Fusus* (*Neptunea*) *setosus*, n.sp. S
* ,, (*Sipho*) n.sp. (?). N
Ianthina exigua, Lamarck (surface). T N
,, *rotundata*, Leach (surface). S N
* *Lamellaria* sp. (?). S
* *Lepeta* (*Pilidium*) *fulva* (Müller). N
Mitrularia uncinata (Reeve). T N
* *Nassa dissimilis*, n.sp. S
– *Natica radiata*, n.sp. N
,, sp. (?). T N
Odostomia (*Turbonilla*) *compressa*, Jeffreys. N
Philine quadrata (Wood). N
* *Pleurobranchus* sp. (?). S
* *Pleurotoma phymatias*, n.sp. T
– ,, (*Mangelia*) *acanthodes*, n.sp. N
* ,, (,,) *incincta*, n.sp. N
* ,, (,,) *macra*, n.sp. N
– ,, (,,) *tiara*, n.sp. T N
* ,, (,,) sp. (?). N
* ,, (*Pleurotomella*) *pruina*, n.sp. N
* ,, (,,) sp. (?). N
– ,, (*Surcula*) *staminea*, n.sp. S
* ,, (*Thesbia*) *membranacea*, n.sp. S
* ,, (,,) *xanthias*, n.sp. S
* ,, sp. (?). N
* *Puncturella brychia*, n.sp. N
* *Purpura* (?) sp., fry. N
– *Ringicula peracuta*, n.sp. T N
* *Rissoa amblia*, n.sp. N
Rissoa (*Alvania*) *deliciosa*, Jeffreys. T N
* *Rotella* (?) sp. N
– *Scalaria acus*, n.sp. T N
* *Scaphander gracilis*, n.sp. N
,, *punctostriatus* (Mighels). T N
Seguenzia carinata, Jeffreys. T N
– ,, *ionica*, n.sp. T N
,, *monocingulata*, Seguenza. T N
* *Siliquaria* (*Tenagodus*) *bernardii*, Mörch. N
* *Siphodentalium pusillum*, n.sp. N
Trachysma delicatum (Philippi). T N
* *Trochus* (*Margarita*) *brychius*, n.sp. S
* ,, (,,) *infundibulum*, n.sp. S N
– ,, (,,) *rhina*, n.sp. N
– ,, (,, ?) *scintillans*, n.sp. T N
– ,, (*Ziziphinus*) *tiara*, n.sp. T N
* ,, sp. (?). N
* *Utriculus leucus*, n.sp. N
* ,, n.sp. (?). N

POLYPLACOPHORA :

* *Leptochiton belknapi*, Dall. T

CEPHALOPODA :

Cirroteuthis magna, n.sp. S
* *Eledonella diaphana*, n.sp. T
Enoploteuthis margaritifera, Rüppell. T
* *Octopus* sp. (?). T
* *Taonius hyperboreus*, Steenstrup (surface ?). N

POLYZOA :

Catenicella elegans, Busk. S T
* *Cellularia cirrata*, n.sp. T
* *Crisia biciliata*, MacGillivray. S

Farciminaria hexagona, n.sp. S T
Hippothoa divaricata, Lamouroux. S N
* *Lichenopora hispida* (Fleming). S
Scrupocellaria macandrei, Busk.

Brachiopoda :

Discina atlantica, King. S T N
Magasella flexuosa (King). S
Terebratella frielii, n.sp. T N
Terebratula vitrea (Born), var. *minor*, Philippi. S T N
,, *wyvillii*, n.sp. S T N

Tunicata :

Corynascidia suhmi, n.g., n.sp. S
* *Culeolus recumbens*, n.g., n.sp. S
Octacnemus bythius, n.g., n.sp. S T

Fishes :

* *Acanthonus armatus*, n.g., n.sp. T
* *Alepocephalus niger*, n.sp. T
Antimora rostrata, n.g., n.sp. S
* *Aphyonus gelatinosus*, n.g., n.sp. T
* *Argyropelecus olfersii*, Cuvier (surface ?). N
Bathyonus compressus, n.g., n.sp. T
* *Bathysaurus ferox*, n.g., n.sp. S
* *Bathytroctes microlepis*, n.g., n.sp. N
* *Chlorophthalmus gracilis*, n.sp. S
Gonostoma microdon, n.sp. S T N
* *Halosaurus macrochir*, n.sp. S N
Macrurus armatus, Hector. S T N
* ,, *fernandezianus*, n.sp. S
,, *filicauda*, n.sp. S
* ,, *murrayi*, n.sp. S
* ,, *sclerorhynchus*, Val. N
Melamphaës crassiceps, n.sp. S T
* ,, *microps*, n.sp. S
* *Porogadus gracilis*, n.sp. T
Sternoptyx diaphana (Herm.). S T N
Synaphobranchus bathybius, n.sp. S N
,, *brevidorsalis*, n.sp. T N

Notes on the Bathymetrical Distribution.—Of the species in the above list 92 species (or 18 per cent.) were taken at more than one Station (when taken at more than two Stations the number of times is indicated within brackets after the name), viz :—

Trichostemma sarsii.
Protoptilum aberrans.
Schizopathes affinis.
Corallimorphus rigidus.
Bathyactis symmetrica (5).
Caryophyllia communis (3).
Deltocyathus italicus.
Flabellum alabastrum.
Freycllia bracteata (3).
Paracyathus armatus.
Plutonaster bifrons.
Pontaster forcipatus (4).
Porcellanaster caruleus (3).
Zoroaster fulgens.
Amphilepis norvegica.
Amphiura otteri (3).
Ophiacantha bidentata.
,, *cosmica* (3).
Ophiernus vallincola.
Ophiocten amitinum.
,, *hastatum* (3).
Ophioglypha lepida (3).
Ophiomitra chelys.
Ophiomusium lymani (3).
Cystechinus wyvillii.
Echinus elegans.
,, *norvegicus.*
Podocidaris prionigera.
Salenia varispina.
Urechinus naresianus.
Benthodytes papillifera.
Euphronides depressa.
Holothuria murrayi.
Kolga nana.
Carinina grata.
Laxmonice producta.

Maldanella antarctica.
Cythere acanthoderma (3).
„ *dasyderma* (7).
„ *dictyon* (7).
„ *irpex* (3).
„ *serratula.*
Cytheropteron mucronalatum.
Krithe producta (5).
Calanus princeps.
Eucopia australis (3).
Benthesicymus altus.
„ *brasiliensis.*
Dorodotes reflexus.
Gennadas parvus.
Hymenodora rostrata.
Nematocarcinus productus.
„ *proximatus* (3).
Pontophilus gracilis.
Munidopsis subsquamosa.
Pagurodes inarmatus.
Parapagurus abyssorum (6).
Colossendeis gigas.
„ *leptorhynchus.*
Amussium lucidum.
„ *meridionale.*
Arca (*Barbatia*) *corpulenta.*
Callocardia atlantica.
Dacrydium vitreum.
Limopsis aurita.
Malletia obtusa.
Semele (*Abra*) *profundorum.*
Actæon amabilis.
Bulla semilevis.
Cadulus gracilis.
„ *tumidosus.*
Cithna tenella.
Clathurella chariessa (3).
„ *formosa* (3).
Cylichna ovata.
Dentalium capillosum.
„ *subterfissum.*
Ianthina exigua.
Pleurotoma (*Mangelia*) *macra.*
Scaphander gracilis.
„ *punctostriatus.*
Seguenzia carinata (3).
Trochus (*Margarita*) *infundibulum.*
„ („) *rhina.*
Discina atlantica.
Terebratula wyvillii (3).
Acanthonus armatus.
Bathyonus compressus.
Chlorophthalmus gracilis (3).
Gonostoma microdon (3).
Halosaurus macrochir.
Melamphaës crassiceps.

The majority of these were taken at two Stations, while 18 were taken at three Stations, 1 at four Stations, 2 at five Stations, 1 at six Stations, and 2 at seven Stations.

Of the 231 species taken in this zone between 1000 and 1500 fathoms, as well as in deeper or shallower zones (those without asterisks), 25 species (or 11 per cent.) were taken in the zone beyond 2500 fathoms, 42 species (or 18 per cent.) in the zone between 2000 and 2500 fathoms, and 85 species (or 37 per cent.) in the zone between 1500 and 2000 fathoms ; lists of these have already been given (see pp. 1281, 1289, 1299–1300).

The following 74 species (or 32 per cent.) were taken in the zone between 500 and 1000 fathoms :—

Thenea schmidtii.
Chonelasma lamella.
Euplectella suberea.
Bathyactis symmetrica.
Caryophyllia communis.
Deltocyathus italicus.
Stephanotrochus diadema.
Antedon alternata.
„ *basicurva.*
„ *breviradia.*
„ *inæqualis.*
Pentacrinus naresianus.
Neomorphaster eustichus.
Zoroaster fulgens.

Amphiura concolor.
„ *otteri.*
Ophiacantha cosmica.
Ophiactis pea.
Ophiogeron edentulus.
Ophioglypha jejuna.
„ *lepida.*
„ *meridionalis.*
Ophiomitra plicata.
Ophiomusium lymani.
Ophiozona stellata.
Asthenosoma gracile.
Brissopsis luzonica.
Echinus acutus.
„ *norvegicus.*
Phormosoma hoplacantha.
„ *luculentum.*
Pourtalesia laguncula.
Prionechinus sagittiger.
Salenia hastigera.
Holothuria lactea.
Trochostoma albicans.
Aricia norvegica.
Laimonice producta.
Leanira hystricis.
Bairdia victrix.
Cythere acanthoderma.
„ *dasyderma.*
„ *dictyon.*
Krithe producta.
Scalpellum acutum.
„ *velutinum.*
Cystisoma spinosum.
Acanthomunna proteus.
Serolis bromleyana.
Gnathophausia zoëa.
Acanthephyra sica.
Benthesicymus altus.
Gennadas parvus.
Nematocarcinus tenuipes.
Oplophorus typus.
Pentacheles lævis.
Polycheles helleri.
Munidopsis brevimana.
Ethusa (*Ethusina*) *gracilipes.*
Amussium lucidum.
Cryptodon croulinensis.
Lima (*Limatula*) *confusa.*
Cassis sp. (?).
Cithna tenella.
Dentalium subterfissum.
Ianthina exigua.
Natica sp. (?).
Seguenzia carinata.
„ *monocingulata.*
Farciminaria hexagona.
Antimora rostrata.
Gonostoma microdon.
Melamphaës crassiceps.
Sternoptyx diaphana.

The following 102 species (or 45 per cent.) were taken in the zone between 100 and 500 fathoms :—

Phakellia ventilabrum.
Azorica pfeiffera.
Thenea schmidtii.
Aphrocallistes bocagei.
Aulocalyx irregularis.
Dactylocalyx patella.
Lefroyella decora.
Bathyactis symmetrica.
Caryophyllia communis.
Deltocyathus italicus.
Solenosmilia variabilis.
Pentacrinus nareszianus.
Paracucharites armatus.
Amphilepis norvegica.
Ophiacantha cosmica.
Ophiocten amitinum.
Ophioglypha jejuna.
„ *lepida.*
„ *variabilis.*
Ophiomastus tegulitius.
Ophiomitra chelys.
Asthenosoma gracile.
Brissopsis luzonica.
Echinus acutus.
„ *elegans.*
„ *norvegicus.*
Phormosoma bursarium.
„ *hoplacantha.*
„ *luculentum.*
Pourtalesia laguncula.
Prionechinus sagittiger.
Salenia hastigera.

Salenia varispina.
Schizaster moseleyi.
Holothuria murrayi.
Lætmogone wyville-thomsoni.
Terebellides strœmi.
Bairdia foveolata.
„ *victrix.*
Cythere dasyderma.
„ *dictyon.*
„ *scutigera.*
„ *serratula.*
„ *speyeri.*
Cytheropteron fenestratum.
Krithe producta.
Xestoleberis curta.
Serolis antarctica.
„ *bromleyana.*
Acanthephyra sica.
Benthesicymus altus.
„ *brasiliensis.*
„ *pleocanthus.*
Gennadas parvus.
Nematocarcinus productus.
„ *tenuipes.*
Penæus serratus.
Colossendeis leptorhynchus.
Amussium cancellatum.
Arca (*Barbatia*) *corpulenta.*
„ („) *pteroessa.*
Cryptodon croulinensis.
Ervilia castanea.
Leda jeffreysi.
Lima (*Limatula*) *confusa.*
Limopsis aurita.
Bulla semilevis.
Cadulus gracilis.
Cithna tenella.
Clathurella chariessa.
„ *formosa.*
Cylichna ovata.
Dentalium capillosum.
„ *circumcinctum.*
Fenella elongata.
Ianthina exigua.
Mitrularia uncinata.
Natica radiata.
„ sp. (?).
Odostomia (*Turbonilla*) *compressa.*
Pleurotoma (*Mangelia*) *acanthodes.*
„ („) *tiara.*
„ (*Surcula*) *staminea.*
Ringicula peracuta.
Rissoa (*Alvania*) *deliciosa.*
Scalaria acus.
Scaphander punctostriatus.
Seguenzia ionica.
„ *monocingulata.*
Trachysma delicatum.
Trochus (*Margarita*) *rhina.*
„ („) *scintillans.*
„ (*Ziziphinus*) *tiara.*
Catenicella elegans.
Farciminaria hexagona.
Hippothoa divaricata.
Discina atlantica.
Terebratella frielii.
Terebratula vitrea.
Gonostoma microdon.
Macrurus armatus.
Synaphobranchus brevidorsalis.

The following 37 species (or 16 per cent.) were taken in depths less than 100 fathoms or at the surface :—

Rhizochalina fistulosa.
Tentorium semisuberites.
Azorica pfeifferæ.
Bathyactis symmetrica.
Cribrella oculata.
Leptoptychaster arcticus.
Ophiacantha bidentata.
Brissopsis luzonica.
Salenia hastigera.
Cerebratulus angusticeps.
Eunice œrstedi.
? *Notomastus agassizii.*
Bairdia foveolata.
„ *victrix.*
Cythere dictyon.
„ *scutigera.*
„ *stolonifera.*
Xestoleberis curta.
„ *variegata.*
Cyphocaris micronyx (deep tow-net).
Elasmopus subcarinata.
Gennadus parvus (surface).

Hymenodora rostrata (deep tow-net).
Nematocarcinus proximatus.
Penæus velutinus.
Parapagurus abyssorum.
Amussium cancellatum.
Ervilia castanea.
Lima multicostata.
Venus (Chamelæa) mesodesma.
Ianthina rotundata (surface).
Mitrularia uncinata.
Philine quadrata.
Catenicella elegans.
Scrupocellaria macandrei.
Magasella flexuosa.
Sternoptyx diaphana (surface).

Of the 277 species taken only in this zone between 1000 and 1500 fathoms, 204 species (or 74 per cent.) are new to science, and the following 19 new genera (each represented by a single species), were taken only in this zone of depth :—

Nauphanta.
Pectis.
Aphroditaster.
Ophiambix.
Ophiotrochus.
Enypniastes.
Euphronides.
Carinina.
Crossophorus.
Camacho.
Onesimoides.
Platamon.
Anuropus.
Leiopus.
Orphania.
Paraxius.
Stochasmus.
Acanthonus.
Aphyonus.

Notes on the Geographical Distribution.—An examination of the foregoing list shows that of the 508 species taken in this zone between 1000 and 1500 fathoms, 231 species (or 44 per cent.) were taken south of the southern tropic, 194 species (or 38 per cent.) were taken within the tropics, and 267 species (or 53 per cent.) were taken north of the northern tropic ; while 38 species (or 8 per cent.) were found to be common to all those three areas, 29 species (or 6 per cent.) were common to the southern and northern areas, 27 species (or 5 per cent.) were common to the southern and tropical areas, and 49 species (or 10 per cent.) were common to the tropical and northern areas.

5. Animals obtained in the Dredgings and Trawlings in Depths between 500 and 1000 Fathoms.

The Challenger dredged or trawled at 23 Stations where the depth was between 500 and 1000 fathoms, about 2000 specimens of invertebrates and fishes being procured, belonging to about 710 species and about 425 genera. The total number of species and genera actually described and recorded in the Zoological Reports from the zone between these depths amounts to 631 species and 363 genera, of which 501 species (or about 80 per cent.) and 95 genera (or 26 per cent.) are new to science, as shown in the following list. Those species taken by the Challenger in this zone only (numbering 406 species or 64 per cent.) are indicated by an asterisk thus.* The geographical distribution of the species is indicated by the heavy letters, S, T, and N, used to denote that the species

was taken *south* of the tropic of Capricorn (S), *between* the tropics of Capricorn and Cancer (T), or *north* of the tropic of Cancer (N).

MONAXONIDA :

* *Amphilectus annectens*, n.sp. S
Axinella erecta (Carter). S
* ,, (?) *tubulosa*, n.sp. S
* *Chondrocladia clavata*, n.sp. T
* *Ciocalypta amorphosa*, n.sp. S
* ,, *hyaloderma*, n.sp. S
* *Cladorhiza pentacrini*, n.sp. S
* *Esperella lapidiformis*, n.sp. S
* *Esperiopsis challengeri*, n.sp. T
* ,, ,, var. *meangensis*, nov.
* *Gellius calyx*, n.sp. S
,, *carduus*, n.sp. S
* ,, *flabelliformis*, n.sp. S
* ,, *lævis*, n.sp. S
* ,, sp. (?). S
* *Halichondria latrunculioides*, n.sp. S
* ,, sp. (?). S
Iophon chelifer, n.sp. S
Latrunculia apicalis, n.sp. S
* ,, *brevis*, n.sp. S
* *Myxilla compressa*, n.sp. S
* ,, *frondosa*, n.sp. S
* ,, *hastata*, n.sp. S
,, *nobilis*, n.sp. S
* ,, *spongiosa*, n.sp. S
* *Phelloderma radiatum*, n.g., n.sp. S
* *Polymastia corticata*, n.sp. T
* *Suberites axiatus*, n.sp. S
,, *caminatus*, n.sp. S
,, *mollis*, n.sp. S
,, *ramulosus*, n.sp. T
Tedania massa, n.sp. S
Vomerula esperioides, n.sp. S

TETRACTINELLIDA :

* *Pœcillastra tenuilaminaris*, n.sp. N
* *Tetilla leptoderma*, n.sp. S
* ,, *pedifera*, n.sp. T
* ,, sp. (?). N
Thenea schmidtii, n.n. T N

HEXACTINELLIDA :

* *Aulochone cylindrica*, n.g., n.sp. S
* ,, *lilium*, n.g., n.sp. T
* *Chonelasma hamatum*, n.g., n.sp. S
,, *lamella*, n.g., n.sp. S N
* ,, sp. (?). S
Euplectella suberea, n.sp. T N
* *Euryplegma auriculare*, n.g., n.sp. S
Farrea occa (Bowerbank), Carter. S T
* *Hyalonema lusitanicum*, Bocage. N
* *Poliopogon gigas*, n.g., n.sp. S
Rossella antarctica, Carter. S
* *Tægeria pulchra*, n.g., n.sp. T
* *Walteria flemmingii*, n.g., n.sp. S

ALCYONARIA :

* *Acanthogorgia longiflora*, n.sp. T
* *Anthomastus steenstrupi*, n.sp. N
* *Calyptrophora japonica*, Gray. T
* ,, *wyvillei*, n.sp. S
Ceratoisis grandiflora, Studer. T
* *Dasygorgia acanthella*, n.sp. S
,, *axillaris*, n.sp. S T
* ,, *expansa*, n.sp. S
* ,, *squarrosa*, n.sp. T
* *Primnoella magellanica*, Studer. S
* ,, *murrayi*, n.sp. S
Primnoisis rigida, n.g., n.sp. S

Sarakka crassa, Danielssen. S
* *Stachyodes regularis*, n.g., n.sp. S
* *Stenella acanthina*, n.sp. S
,, *gigantea*, n.sp. T
* *Strophogorgia challengeri*, n.g., n.sp. N
,, *verrilli*, n.g., n.sp. N
* *Sympodium verrilli*, n.sp. S
* *Thouarella antarctica* (Valenciennes). S
* ,, *moseleyi*, n.sp. S

Pennatulida :

* *Anthoptilum thomsoni*, n.g., n.sp. S
* *Kophobelemnon* sp. (?). S
* *Leptoptilum gracile*, n.g., n.sp. S
* *Microptilum willemoesi*, n.g., n.sp. N
* *Pennatula pearceyi*, n.sp. N
* *Protocaulon molle*, n.g., n.sp. S
* *Scleroptilum durissimum*, n.g., n.sp. N
* *Umbellula durissima*, n.sp. N
* ,, *huxleyi*, n.sp. N
* *Virgularia bromleyi*, n.sp. N

Actiniaria :

* *Epizoanthus parasiticus*, Verrill. N
Phellia spinifera, n.sp. S
* *Polysiphonia tuberosa*, n.g., n.sp. N

Corals :

* *Allopora profunda*, n.sp. S
* *Astylus subviridis*, n.g., n.sp. T
* *Bathelia candida*, n.g., n.sp. S
Bathyactis symmetrica (Pourtalès). S T N
Caryophyllia communis (Seguenza). S N
* ,, *lamellifera*, n.sp. S
,, *maculata* (Pourtalès). S T
* *Cladocora debilis*, M.-Edwards and Haime. S
* *Conopora tenuis*, n.g., n.sp. S
Cryptohelia pudica, M.-Edwards and Haime. S T N
Cyathoceras cornu, n.g., n.sp. S
* *Cyathohelia axillaris*, M.-Edwards and Haime. T
Deltocyathus italicus, M.-Edwards and Haime. S T N
Errina labiata, n.sp. S
Flabellum apertum, n.sp. S N
* ,, *curvatum*, n.sp. S
* *Spinipora echinata*, n.g., n.sp. S
* *Sporadopora dichotoma*, n.g., n.sp. S
Stenohelia profunda, n.sp. S T
Stephanotrochus diadema, n.g., n.sp. T N
* ,, *discoides*, n.g., n.sp. T
* *Stylaster densicaulis*, n.sp. S
* ,, *erubescens*, Pourtalès. S
,, *gracilis*, M.-Edwards and Haime. S T
* ,, *lævis*, Studer. S
* ,, sp. (?). T

Hydroida :

* *Cladocarpus formosus*, Allman. N
* ,, *pectiniferus*, n.sp. N
* *Cryptolaria gracilis*, n.sp. S
* *Perisiphonia pectinata*, n.g., n.sp. S
* *Sertularia clausa*, n.sp. S
* ,, *producta*, n.sp. T
* *Thuiaria hyalina*, n.sp. T

Deep-Sea Medusæ :

* *Drymonema victoria*, Haeckel. N
* *Pectanthis asteroides*, Haeckel. N

Siphonophoræ :

* *Rhodalia miranda*, n.g., n.sp. S

Crinoidea :

Actinometra parvicirra (Müller). S T
,, *typica* (Lovén). T

* *Antedon acœla*, n.sp. T
* ,, *aculeata*, n.sp. T
– ,, *alternata*, n.sp. S T N
* ,, *angusticalyx*, n.sp. T
* ,, *angustipinna*, n.sp. S
– ,, *basicurva*, n.sp. S T
– ,, *breviradia*, n.sp. S T
* ,, *echinata*, n.sp. S
* ,, *gracilis*, n.sp. T
– ,, *inæqualis*, n.sp. S T
* ,, *incerta*, n.sp. S
* ,, *incisa*, n.sp. S T
* ,, *lævis*, n.sp. T
* ,, *lineata*, n.sp. S
* ,, *longipinna*, n.sp. S
– ,, *multispina*, n.sp. S T
* ,, *occulta*, n.sp. T
* ,, *similis*, n.sp. T
* ,, *tuberculata*, n.sp. T
* ,, *valida*, n.sp. T
* *Atelecrinus wyvillii*, n.sp. T
* *Eudiocrinus japonicus*, n.g., n.sp. N
– ,, *semperi*, n.g., n.sp. S
* *Metacrinus costatus*, n.g., n.sp. T
* ,, *moseleyi*, n.g., n.sp. T
* ,, *murrayi*, n.g., n.sp. T
* ,, *nodosus*, n.g., n.sp. S
* ,, *varians*, n.g., n.sp. S T
* ,, *wyvillii*, n.g., n.sp. S T
– *Pentacrinus alternicirrus*, n.sp. S T
* ,, (?) *mollis*, n.sp. N
– ,, *naresianus*, n.sp. S T
* *Promachocrinus naresi*, n.g., n.sp. T
* *Rhizocrinus rawsoni*, Pourtalès. N
– ,, *lofotensis*, Sars. S T

ASTEROIDEA :

* *Asterias vesiculosa*, n.sp. T
* *Cnemidaster wyvillii*, n.g., n.sp. T
* *Cribrella sufflata*, n.sp. S
– *Ctenodiscus australis* (Lovén, MS.), Lütken. S
* *Dytaster æquivocus*, n.g., n.sp. T
* *Freyella polycnema*, n.sp. S
* *Hymenaster glaucus*, n.sp. N
– *Labidiaster annulatus*, n.sp. S T
– *Neomorphaster eustichus*, n.g., n.sp. N
* *Nymphaster basilicus*, n.g., n.sp. T
– *Pararchaster semisquamatus*, n.g., n.sp. N
* *Pontaster mimicus*, n.g., n.sp. T
– ,, *venustus*, n.g., n.sp. T N
– *Porania spiculata*, n.sp. S T
* *Porcellanaster caulifer*, n.g., n.sp. T
* *Solaster torulatus*, n.sp. S
– *Zoroaster fulgens*, Wyville Thomson. T N

OPHIUROIDEA :

* *Amphiura acacia*, n.sp. N
* ,, *argentea*, n.sp. S
– ,, *bellis*, n.sp. T N
* ,, *canescens*, n.sp. S
– ,, *concolor*, n.sp. T
* ,, *glabra*, n.sp. T
– ,, *glauca*, n.sp. N
* ,, *iris*, n.sp. N
* ,, *lanceolata*, n.sp. S
– ,, *otteri*, Ljungman. N
* *Astroceras pergamena*, n.g., n.sp. N
* *Astroschema horridum*, n.sp. S
* ,, *salix*, n.sp. S
– *Ophiacantha abnormis*, n.sp. T
* ,, *cornuta*, n.sp. S
– ,, *cosmica*, n.sp. S T
* ,, *levispina*, n.sp. T
* ,, *pentacrinus*, Lütken (?). T
– ,, *rosea*, n.sp. S N
* ,, *scolopendrica*, n.sp. N

* *Ophiacantha vepratica*, n.sp. S
,, *vivipara*, Ljungman. S
* *Ophiactis cuspidata*, n.sp. S
,, *flexuosa*, n.sp. S
* ,, *nama*, n.sp. S T
* ,, *pectorale*, n.sp. T
,, *poa*, n.sp. S
* ,, sp. (?). S
* ,, sp. (?). T
* *Ophioceramis* (?) *clausa*, n.sp. S
,, (?) *obstricta*, n.sp. S T
Ophiochiton fastigatus, n.g., n.sp. T N
* ,, *lentus*, n.g., n.sp. S
* *Ophiochondrus stelliger*, n.sp. S
Ophiocreas œdipus, n.sp. T
Ophiogeron edentulus, n.g., n.sp. T N
* *Ophioglypha albata*, n.sp. N
,, *confragosa*, n.sp. S N
* ,, *inermis*, n.sp. S
,, *jejuna*, n.sp. S
* ,, *lapidaria*, n.sp. N
,, *lepida*, n.sp. T N
,, *meridionalis*, n.sp. S
* ,, *rugosa*, n.sp. S
Ophiomitra normani, n.sp. N
,, *plicata*, n.sp. S T
Ophiomusium cancellatum, n.sp. N
,, *lymani*, Wyville Thomson. S T N
* ,, *scalare*, n.sp. S
* *Ophiomyces spathifer*, n.sp. N
* *Ophiopholis japonica*, n.sp. N
* *Ophiophyllum petilum*, n.g., n.sp. S T
* *Ophiozona depressa*, n.sp. T
,, *stellata*, n.sp. S
* *Pectinura heros*, n.sp. T

ECHINOIDEA :

Aceste bellidifera, n.g., n.sp. S T N
Aërope rostrata, n.g., n.sp. T N
* *Argopatagus vitreus*, n.g., n.sp. T
Aspidodiadema tonsum, n.g., n.sp. S T
Asthenosoma gracile, n.sp. S T
Brissopsis luzonica (Gray). S T N
* *Cionobrissus revinctus*, n.g., n.sp. T
Dorocidaris (*Cidaris*) *papillata*, Leske. S T N
Echinus acutus, Lamarck. S T N
,, *norvegicus*, Düben and Koren. S N
* *Hemiaster gibbosus*, n.sp. T N
* ,, *zonatus*, n.sp. T N
Maretia alta, Agassiz. T
* *Micropyga tuberculata*, n.g., n.sp. T
Phormosoma hoplacantha, n.sp. S N
,, *luculentum*, n.sp. T
* ,, *rigidum*, n.sp. N
* *Porocidaris elegans*, n.sp. S T
* *Pourtalesia laguncula*, n.sp. S T N
Prionechinus sagittiger, n.g., n.sp. S T
Salenia hastigera, n.sp. S T N
* *Trigonocidaris monolini*, n.sp. S

HOLOTHURIOIDEA :

* *Ankyroderma marenzelleri*, n.sp. S
Cucumaria serrata, n.sp., var. *marionensis*, nov. S
Holothuria lactea, n.sp. S N
* *Lætmogone spongiosa*, n.g., n.sp. N
* *Pælopatides* (?) *appendiculata*, n.g., n.sp. N
* ,, *aspera*, n.g., n.sp. T
Pannychia moseleyi, n.g., n.sp. S
Psolus antarcticus, Philippi. S
* ,, *murrayi*, n.sp. S
,, *operculatus*, Pourtalès. S N
Trochostoma albicans, n.sp., var. *glabra*, nov. S N

Trochostoma violaceum, Studer. S
* ,, (?) sp. S

ENTOZOA :

* *Ascaris macruri*, n.sp. (parasitic on *Macrurus*). S

NEMERTEA :

Cerebratulus macroren, n.sp. S N
* *Eupolia australis*, n.g., n.sp. S
* ,, *giardii*, n.g., n.sp. S
Pelagonemertes rollestoni, n.g., n.sp. (surface ?). S N

GEPHYREA :

* *Phascolosoma prioki*, Sluiter. T
* *Sternaspis princeps*, n.sp. S

ANNELIDA :

Aricia norvegica, Sars. T N
* *Chætozone pacifica*, n.sp. S
Ehlersiella atlantica, n.g., n.sp. N
Eulagisca corrientis, n.g., n.sp. S
* *Genetyllis* (?) *oculata*, n.sp. T
Hyalinœcia tubicola, Müller. S T N
,, ,, var. *longibranchiata*, nov.
* *Iphionella cimex* (Quatrefages). T
* *Lænilla fusca*, n.sp. S
* *Lætmonice aphroditoides*, n.sp. N
,, *producta*, Grube, var. *willemoesi*, nov. S T N
* *Lagisca* (?) *kermadecensis*, n.sp. S
* *Lanassa sarsi*, n.sp. S
Leanira hystricis, Ehlers. N
* *Lumbriconereis neo-zealaniæ*, n.sp. S
* *Nicidon balfouriana*, n.sp. S
Nothria conchylega, Sars. N
* ,, *minuta*, n.sp. S
,, *tenuisetis*, n.sp. S T
* *Pista corrientis*, n.sp. S
* ,, *mirabilis*, n.sp. S
* *Polynoë magnipalpa*, n.sp. S
* ,, (*Macellicephala*) *mirabilis*, n.sp. S
* *Polynoëlla levisetosa*, n.g., n.sp. N
* *Praxilla* (?) sp. N
* *Sabella assimilis*, n.sp. S
Scalibregma inflatum, Rathke. S
* *Syllis robertianæ*, n.sp. S
* *Terebella kermadecensis*, n.sp. S
* ,, (*Lanice*) sp. (?). N
* *Terebellides* (?) sp. S
* *Thelepus marenzelleri*, n.sp. N

MYZOSTOMIDÆ :

* *Myzostoma asymmetricum*, n.sp. T
* ,, *calycotyle*, n.sp. T
* ,, *cornutum*, Graff. N
* ,, *deformator*, n.sp. S T
* ,, *echinus*, n.sp. T
* ,, *elongatum*, Graff. T
* ,, *fissum*, n.sp. T
* ,, *labiatum*, n.sp. T
,, *murrayi*, n.sp. S T
* ,, *pentacrini*, n.sp. T
* ,, *tenuispinum*, n.sp. S T
,, *willemoesii*, n.sp. S T
,, *wyville-thomsoni*, n.sp. T

OSTRACODA :

Bairdia formosa, Brady. T N
,, *victrix*, Brady. S T N
* ,, sp. (?). N
Bythocypris reniformis, n.g., n.sp. S T
Cythere acanthoderma, n.sp. S T N
,, *adunca*, Brady. T
,, *dasyderma*, n.sp. S T N
,, *dictyon*, n.sp. S T N

* *Cythere ericea*, n.sp. T
* ,, *pyriformis*, n.sp. T
* ,, *radula*, n.sp. T
Cytherella lata, n.sp. T N
,, *punctata*, Brady. S T
* *Cytheridea* sp. (?). T
Krithe bartonensis (Jones). S T
,, *producta*, n.sp. S T N
* *Macrocypris canariensis*, n.sp. N
,, *similis*, n.sp. S T
,, sp. (?). T
* *Xiphichilus* (?) *arcuatus*, n.sp. T

Copepoda :

* *Chondracanthus* (?) *macrurus*, n.sp. S

Cirripedia :

Scalpellum acutum, n.sp. S N
* ,, *album*, n.sp. T
,, *elongatum*, n.sp. S
* ,, *hirsutum*, n.sp. T
,, *intermedium*, n.sp. S
* ,, *japonicum*, n.sp. N
* ,, *novæ-zelandiæ*, n.sp. S
* ,, *parallelogramma*, n.sp. S
* ,, *triangulare*, n.sp. S
,, *velutinum*, n.sp. S N
* *Verruca nitida*, n.sp. T
* ,, *sulcata*, n.sp. S

Amphipoda :

* *Andania boecki*, n.sp. T
* *Anonyx ampulloides*, Spence Bate (Stimpson, MS.). N
Cystisoma spinosum (Fabricius). S T N
* *Elasmopus delaplata*, n.sp. S
* *Euonyx normani*, n.sp. S
* *Eusiroides crassi*, n.g., n.sp. S
Lanceola æstiva, n.sp. T
* *Podoceropsis kermadeci*, n.sp. S

Isopoda :

Acanthomunna proteus, n.g., n.sp. S
* *Anceus bathybius*, n.sp. N
* *Arcturus anna*, n.sp. S
* ,, *cornutus*, n.sp. T
* ,, *myops*, n.sp. S
* ,, *spinifrons*, n.sp. T
* *Eurycope atlantica*, n.sp. N
Neasellus kerguelenensis, n.g., n.sp. S
* *Paranthura chiltoni*, n.sp. S
Serolis bromleyana, n.sp. S
* ,, *gracilis*, n.sp. T
,, *neæra*, n.sp. S
* *Stenetrium haswelli*, n.sp. S
* *Trichopleon ramosum*, n.g., n.sp. T
* Two Isopods undetermined. N
* One ,, ,, T

Schizopoda :

* *Euphausia similis*, n.sp. S
* *Gnathophausia calcarata*, n.g., n.sp. T
* ,, *elegans*, n.g., n.sp. T
* ,, *ingens* (Dohrn). T
,, *zoëa*, n.g., n.sp. S T N

Macrura :

Acanthephyra acutifrons, n.sp. T
,, *brachytelsonis*, n.sp. S T N
* ,, *edwardsii*, n.sp. T
* ,, *media*, n.sp. T
,, *sica*, n.sp. S T N
Benthesicymus altus, n.g., n.sp. S T N
* *Eiconaxius kermadeci*, n.g., n.sp. S
* ,, *parvus*, n.g., n.sp. S
Gennadas parvus, n.g., n.sp. S T N
* *Glyphocrangon aculeata*, M.-Edwards. T
,, *regalis*, n.sp. S T
* *Haliporus neptunus*, n.g., n.sp. T
* ,, *obliquirostris*, n.g., n.sp. S

* *Hemipenæus gracilis*, n.g., n.sp. T
,, *semidentatus*, n.g., n.sp. S T
Heterocarpus alphonsi, n.sp. T N
* ,, *gibbosus*, n.sp. T
* *Hymenodora mollis* (Smith). T
* *Merhippolyte orientalis*, n.g., n.sp. T
* *Nematocarcinus gracilis*, n.sp. S T
* ,, *hiatus*, n.sp. S
* ,, *paucidentatus*, n.sp. T
* ,, *serratus*, n.sp. S
,, *tenuipes*, n.sp. T N
* ,, *tenuirostris*, n.sp. T
,, *undulatipes*, n.sp. S T
* *Nephropsis rosea*, n.sp. N
* ,, *suhmi*, n.sp. T
* *Notostomus brevirostris*, n.sp. T
* ,, *japonicus*, n.sp. N
* *Oplophorus brevirostris*, n.sp. T
* ,, *longirostris*, n.sp. T
,, *typus*, M.-Edwards. T
* *Pandalopsis amplus*, n.g., n.sp. S
Pasiphæa acutifrons, n.sp. S N
* ,, *amplidens*, n.sp. N
Pentacheles euthrix, n.g., n.sp. S T
* ,, *gracilis*, n.g., n.sp. T
,, *lævis*, n.g., n.sp. S T
* *Phoberus tenuimanus*, n.sp. T
Plesionika semilævis, n.g., n.sp. S T
Polycheles helleri, n.sp. S T
* *Procletes biangulatus*, n.g., n.sp. T
Sergestes atlanticus, M.-Edwards. S T N
,, *japonicus*, n.sp. T N
* ,, *kröyeri*, n.sp. S
* ,, *prehensilis*, n.sp. N
* *Stereomastis auriculata*, n.g., n.sp. T
* *Stylodactylus discissipes*, n.sp. S
* ,, *orientalis*, n.sp. S

Anomura :

* *Eupagurus rubricatus*, n.sp. S
* *Homologenus* sp. (?). T
Munida microphthalma, M.-Edwards. S T
,, *spinosa*, n.sp. S
,, *subrugosa* (White). S
Munidopsis brevimana, n.sp. T
* ,, *milleri*, n.sp. T
* ,, *pilosa*, n.sp. T
* *Pagurodes limatulus*, n.g., n.sp. T
* *Paralomis formosus*, n.sp. S
* *Parapagurus affinis*, n.sp. T
Uroptychus australis, n.sp. S T
* ,, *politus*, n.sp. S
* ,, *spinimarginatus*, n.sp. S T

Brachyura :

* *Cyrtomaia suhmii*, n.g., n.sp. T
× *Ethusa* (*Ethusina*) *gracilipes*, n.sp. T
,, (,,) ,, var. *robusta*, nov.
Oncinopus aranea, De Haan. S T

Pycnogonida :

* *Nymphon perlucidum*, n.sp. T
* *Oorhynchus aucklandiæ*, n.g., n.sp. S
Phoxichilidium patagonicum, n.sp., var. *elegans*, nov. S

Lamellibranchiata :

* *Amussium caducum*, n.sp. T
,, *lucidum* (Jeffreys). T N
Cryptodon croulinensis (Jeffreys). N
Ervilia subcancellata, n.sp. T N
Leda messanensis, Seguenza. N
* ,, *solidula*, n.sp. T
Lima goliath, Sowerby. S N
,, (*Limatula*) *confusa*, n.sp. T N
* *Limopsis lata*, n.sp. S
,, *minuta* (Philippi). T N
* *Lyonsia formosa*, Jeffreys. N

* *Malletia arrouana*, n.sp. T
* *Modiola watsoni*, n.sp. T
Montacuta pura, n.sp. N
* *Nexra platensis*, n.sp. S
* ,, *teres*, Jeffreys. N
* *Nucula pernambucensis*, n.sp. T
* ,, sp. (?). T
* *Pecten kermadecensis*, n.sp. S
,, *vitreus* (Chemnitz). S T N
* *Spondylus ostreoides*, n.sp. S

Scaphopoda and Gasteropoda :

Basilissa alta, n.g., n.sp., var. *oxytoma*, nov. T
Bembix æola, n.g., n.sp. N
* *Bittium enode*, n.sp. T
* ,, *mamillanum*, n.sp. T
* *Cadulus colubridens*, n.sp. S
Cassis sp. (?), fry. T N
Cithna tenella, Jeffreys. T N
Clionella lophoëssa, n.sp. T
Cyclostrema conicum, n.sp. T
* ,, *sulcatum*, n.sp. T
* *Dentalium diarrhox*, n.sp. S
,, *entalis*, Linné, var. *agile*, Sars. S T N
,, *subterfissum*, Jeffreys. T N
* *Echinella* (?) *tectiformis*, n.sp. N
* *Gaza dædala*, n.g., n.sp. T
Ianthina exigua, Lamarck (surface). T N
Marginella (*Glabella*) *musica*, Hinds. S N
Murex (*Phyllonotus*) *zelandicus*, Quoy and Gaimard. S T
* *Nassa* (*Tritia*) *brychia*, n.sp. N
* ,, (,,) *ephamilla*, n.sp. S
* *Natica amphiala*, n.sp. S
* ,, (*Amauropsis*) *apora*, n.sp. S T
,, sp. (?). T N
* *Odostomia hyphala*, n.sp. S
* *Pleurotoma ischna*, n.sp. S
* ,, (*Bela*) *ula*, n.sp. S
,, (*Genota*) *engonia*, n.sp. S N
* ,, (*Spirotropis*) *brachytona*, n.sp. T
* ,, (,,) *bulbacea*, n.sp. S
* ,, (*Surcula*) *bulbodes*, n.sp. T
* ,, (,,) *dissimilis*, n.sp. T
* ,, (,,) *goniodes*, n.sp. S
* ,, (,,) *gypsata*, n.sp. S
* ,, (,,) *hemimeres*, n.sp. T
* ,, (*Typhlomangelia*) *paupera*, n.sp. T
* ,, two species undetermined. T
* *Scalaria* sp (?). T
* *Scaphander mundus*, n.sp. T
* ,, *niveus*, n.sp. T
Seguenzia carinata, Jeffreys. T N
,, *monocingulata*, Seguenza, var. *lineata*, nov. T N
* ,, *trispinosa*, n.sp. T
* *Trochus* (*Margarita*) *clavatus*, n.sp. T
* ,, (,,) *streptophorus*, n.sp. T
* ,, (,,) sp. (?). S
* ,, two species undetermined. T
* *Turbo transenna*, n.sp. N
* *Utriculus* (*Tornatina*) *pachys*, n.sp. S

Nudibranchiata :

* *Euplocamus pacificus*, n.sp. S

Cephalopoda :

* *Amphitetrus pelagicus*, n.g., n.sp. S
* *Cirroteuthis meangensis*, n.sp. S T
* *Eledone brevis*, n.sp. S
* ,, *verrucosa*, Verrill. S

* *Japetella prismatica*, n.g., n.sp. T
* *Sepia recurvirostra*, Steenstrup. T

POLYZOA :

* *Bicellaria bella*, n.sp. T
* ,, *macilenta*, n.sp. T
* ,, *moluccensis*, n.sp. T
Bifaxaria abyssicola, n.g., n.sp. S N
* ,, *denticulata*, n.g., n.sp. S
* ,, *lævis*, n.g., n.sp. T
* ,, *papillata*, n.g., n.sp. T
* *Brettia australis*, n.sp. T
Bugula reticulata, n.sp. S T N
* *Caberea crassimarginata*, n.sp. S
,, *darwinii*, Busk. S
Carbasea dissimilis, Busk. S T
* ,, *moseleyi*, n.sp. S
,, *pedunculata*, n.sp. N
Catenicella elegans, Busk. S T
* *Cellepora rudis*, n.sp. S
* *Cellularia biloba*, n.sp. N
* *Cribrilina latimarginata*, n.sp. S
,, *monoceros* (Busk). S N
* *Crisia acuminata*, n.sp. S
,, *biciliata*, MacGillivray. S
Farciminaria hexagona, n.sp. S T
Flustra biseriata, n.sp. S T
Foveolaria (?) *elliptica*, n.g., n.sp. S
* ,, *falcifera*, n.g., n.sp. S
Hippothoa divaricata, Lamouroux. S N
* *Hornera lichenoides* (Linné). S
Ichthyaria oculata, n.g., n.sp. S
* *Idmonea fissurata*, n.sp. S
,, *marionensis*, Busk. S
Lichenopora hispida (Fleming). S
* *Melicerita atlantica*, n.sp. S
* ,, (?) *dubia*, n.sp. S
Membranipora galeata, Busk, var. *erecta*, nov. S N
Membranipora umbonata, Busk. S
* *Myriozoum immersum*, n.sp. S
,, *marionense*, n.sp. S
* ,, *simplex*, n.sp. S
Nellia oculata, Busk. S T
Retepora cavernosa, n.sp. S
,, *gigantea*, n.sp. S
* ,, *magellensis*, n.sp. S
Reteporella myriozoides, n.g., n.sp. S
* *Salicornaria dubia*, n.sp. S
Schizoporella elegans (d'Orbigny). S
* *Siphonicytara serrulata*, n.g., n.sp. T
* *Smittia smittiana*, n.sp. S
Turritigera stellata, n.g., n.sp. S
* *Vincularia labiata*, n.sp. S

BRACHIOPODA :

Terebratula uva, Broderip. S
* *Terebratulina* (?) *murrayi*, n.sp. S

TUNICATA :

* *Aplidium incrustans*, n.sp. S
Ascidia meridionalis, n.sp. S
,, *tenera*, n.sp. S
* *Cœlocormus huxleyi*, n.g., n.sp. S
* *Culeolus wyville-thomsoni*, n.g., n.sp. S
* *Hypobythius moseleyi*, n.g., n.sp. S
Leptoclinum tenue, n.sp. S
* *Molgula pyriformis*, n.sp. S
* *Polycarpa aspera*, n.sp. S
* *Polyclinum molle*, n.sp. S
* *Psammaplidium effrenatum*, n.g., n.sp. S
* ,, *flavum*, n.g., n.sp. S
* *Pyrosoma* sp. (?). S
* *Styela flava*, n.sp. S
* ,, *glans*, n.sp. S
* ,, *oblonga*, n.sp. S

FISHES :

Antimora rostrata, n.g., n.sp. S

* *Bathygadus cottoides*, n.g., n.sp. S
* ,, *multifilis*, n.g., n.sp. T
* *Bathypterois longifilis*, n.g., n.sp. S
* ,, *quadrifilis*, n.g., n.sp. T
* *Bathytroctes rostratus*, n.g., n.sp. T
Chauliodus sloanii, Bl. Schn. T N
* *Cottus bathybius*, n.sp. N
Gonostoma elongatum, n.sp. T
,, *microdon*, n.sp. S T N
* *Haloporphyrus ensiferus*, n.sp. S
* *Halosaurus affinis*, n.sp. N
* ,, *mediorostris*, n.sp. T
* *Macrurus æqualis*, n.sp. N
,, *altipinnis*, n.sp. N
* ,, *crassiceps*, n.sp. S
,, *denticulatus*, Richards. S
* ,, *holotrachys*, n.sp. S
* ,, *longifilis*, n.sp. N
,, *nasutus*, n.sp. N
Macrurus parallelus, n.sp. S N
* ,, *rudis*, n.sp. S
* ,, *serrulatus*, n.sp. S
,, *villosus*, n.sp. T N
* *Malacosteus indicus*, n.sp. T
Melamphaës crassiceps, n.sp. S T
* ,, *mizolepis*, n.sp. T
* *Nannobrachium nigrum*, n.g., n.sp. T
Nemichthys infans, n.sp. T
* *Omosudis lowii*, n.g., n.sp. T
* *Pteroidonus quinquarius*, n.g., n.sp. N
* *Raja isotrachys*, n.sp. N
* *Scopelus macrolepidotus* (Johnston). S
Sternoptyx diaphana (Herm.). S T N
Synaphobranchus pinnatus (Gronovius). T N
* *Trachyrhynchus longirostris*, n.sp. S
* *Trachypterus repandus*, Costa. T

Notes on the Bathymetrical Distribution.—Of the species enumerated in the above list 62 species (or 10 per cent.) were taken at more than one Station (when taken at more than two Stations the number of times is indicated within brackets after the name), viz.:—

Myxilla nobilis.
Chondrosia lamella.
Farrea occa.
Cryptolaria pudica (3).
Antedon alternata (3).
,, *inæqualis.*
,, *incisa.*
Metacrinus rotundus.
,, *wyrillii.*
Pentacrinus alternicirrus.
,, *naresianus* (4).
Amphiura bellis.
Ophiacantha cornuta.
Ophiactis cuspidata.
,, *nana.*
Ophiocamax clavata.
Ophioglypha lepida.
Ophiomitra normani.
,, *plicata.*
Ophiomusium lymani (4).
Ophiopholis japonica.
Ophiophyllum pelitum.
Aspidodiadema tonsum.
Hemiaster zonatus.
Pourtalesia laguncula.
* *Salenia hastigera.*
Hyalinœcia tubicola (3).
Bairdia formosa (3).
,, *victrix.*
Cythere dictyon (3).
Cytherella lata.
Krithe producta (3).
Scalpellum acutum.
Cystisoma spinosum (3).
Gnathophausia calcarata.
,, *zoëa.*
Acanthephyra acutifrons.
,, *brachytelsonis* (5).

Acanthephyra sica (3).
Benthesicymus altus (5).
Gennadas parvus.
Haliporus neptunus.
Hemipenæus semidentatus.
Nematocarcinus gracilis.
„ *tenuirostris.*
„ *undulatipes.*
Uroptychus australis.
„ *spinimarginatus.*
Ethusa (*Ethusina*) *gracilipes.*
Modiola watsoni.
Natica (*Amauropsis*) *apora.*
Cirroteuthis meangensis.
Bathygadus cottoides (4).
Bathypterois longifilis.
„ *quadrifilis.*
Gonostoma microdon (5).
Macrurus crassiceps.
„ *parallelus* (4).
„ *rudis* (3).
Scopelus macrolepidotus.
Sternoptyx diaphana (3).
Synaphobranchus pinnatus (3).

The majority of these were taken at two Stations, while 11 were taken at three Stations, 4 at four Stations, and 3 at five Stations.

Of the 225 species taken in this zone between 500 and 1000 fathoms, as well as in deeper or shallower zones, 17 species (or 8 per cent.) were obtained in the zone beyond 2500 fathoms, 18 species (or 8 per cent.) in the zone between 2000 and 2500 fathoms, 30 species (or 13 per cent.) in the zone between 1500 and 2000 fathoms, and 74 species (or 33 per cent.) in the zone between 1000 and 1500 fathoms ; lists of these have already been given (see pp. 1281–2, 1289–90, 1300, 1311–12).

The following 149 species (or 66 per cent.) were taken in the zone between 100 and 500 fathoms :—

Axinella erecta.
Gellius carduus.
Iophon chelifer.
Myxilla nobilis.
Suberites mollis.
Tedania massa.
Vomerula esperioides.
Thenea schmidtii.
Farrea occa.
Rossella antarctica.
Ceratoisis grandiflora.
Dasygorgia axillaris.
Sarakka crassa.
Phellia spinifera.
Bathyactis symmetrica.
Caryophyllia communis.
„ *maculata.*
Cryptohelia pudica.
Cyathoceras cornu.
Deltocyathus italicus.
Errina labiata.
Flabellum apertum.
Stenohelia profunda.
Antedon multispina.
Eudiocrinus semperi.
Pentacrinus alternicirrus.
„ *naresianus.*
Rhizocrinus lofotensis.
Labidiaster annulatus.
Porania spiculata.
Amphiura bellis.
„ *glauca.*
Ophiacantha abnormis.
„ *cosmica.*
„ *rosea.*
„ *vivipara.*
Ophiactis flexuosa.
Ophioceramis obstricta.
Ophiochiton fastigatus.
Ophiocreas œdipus.
Ophioglypha confragosa.
„ *jejuna.*
„ *lepida.*
Ophiomitra normani.

Ophiomusium cancellatum.
„ *lymani.*
Aërope rostrata.
Asthenosoma gracile.
Brissopsis luzonica.
Dorocidaris (*Cidaris*) *papillata.*
Echinus acutus.
„ *norvegicus.*
Hemiaster gibbosus.
Maretia alta.
Micropyga tuberculata.
Phormosoma hoplacantha.
„ *luculentum.*
Porocidaris elegans.
Pourtalesia laguncula.
Prionechinus sagittiger.
Salenia hastifera.
Cucumaria serrata.
Pannychia moseleyi.
Psolus antarcticus.
Trochostoma violaceum.
Cerebratulus macroren.
Eulagisca corrientis.
Hyalinœcia tubicola.
Nothria teniusetis.
Myzostoma murrayi.
„ *willemoesii.*
„ *wyville-thomsoni.*
Bairdia formosa.
„ *victrix.*
Bythocypris reniformis.
Cythere dasyderma.
„ *dictyon.*
Cytherella lata.
„ *punctata.*
Krithe bartonensis.
„ *producta.*
Macrocypris similis.
Scalpellum elongatum.
„ *intermedium.*
Neaxellus kerguelenensis.
Serolis bromleyana.
Acanthaspyra brachytelsonis.
„ *sica.*
Benthesicymus altus.
Gennadas parvus.
Glyphocrangon regalis.
Hemipenæus semidentatus.
Heterocarpus alphonsi.
Nematocarcinus tennipes.
Nematocarcinus undulatipes.
Pasiphæa acutifrons.
Pentacheles euthrix.
Plesionika semilævis.
Sergestes atlanticus.
„ *japonicus.*
Munida microphthalma.
„ *spinosa.*
„ *subrugosa.*
Uroptychus australis.
Phoxichilidium patagonicum.
Cryptodon croulinensis.
Ervilia subcancellata.
Leda messanensis.
Lima goliath.
„ (*Limatula*) *confusa.*
Limopsis minuta.
Montacuta pura.
Pecten vitreus.
Basilissa alta.
Bembix æola.
Cithna tenella.
Clionella lophoëssa.
Cyclostrema conicum.
Dentalium entalis.
Ianthina exigua.
Maryinella (*Glabella*) *musica.*
Natica sp. (?).
Pleurotoma (*Genota*) *engonia.*
Sequenzia monocingulata.
Trochus (*Margarita*) *clavatus.*
Bugula reticulata.
Caberea darwinii.
Carbasea dissimilis.
„ *pedunculata.*
Catenicella elegans.
Cribrilina monoceros.
Farciminaria hexagona.
Hippothoa divaricata.
Idmonea marionensis.
Membranipora galeata.
„ *umbonata.*
Myriozoum marionense.
Schizoporella elegans.
Turritigera stellata.
Terebratula uva.
Ascidia tenera.
Leptoclinum tenue.
Gonostoma elongatum.
„ *microdon.*

Macrurus denticulatus.
„ *nasutus.*
„ *parallelus.*
Macrurus villosus.
Synaphobranchus pinnatus.

The following 51 species (or 22 per cent.) were taken in depths less than 100 fathoms or at the surface :—

Latrunculia apicalis.
Suberites caminatus.
„ *ramulosus.*
Tedania massa.
Rossella antarctica.
Bathyactis symmetrica.
Stylaster gracilis.
Actinometra parvicirra.
Ctenodiscus australis.
Labidiaster annulatus.
Pontaster venustus.
Porania spiculata.
Ophiacantha vivipara.
Aspidodiadema tonsum.
Brissopsis luzonica.
Dorocidaris (*Cidaris*) *papillata.*
Micropyga tuberculata.
Salenia hastigera.
Cucumaria serrata.
Psolus operculatus.
Trochostoma violaceum.
Hyalinœcia tubicola.
Lætmonice producta.
Notoria conchylega.
Scalibregma inflatum.
Bairdia victrix.
Bythocypris reniformis.
Cythere adunca.
„ *dictyon.*
Cytherella punctata.
Sergestes atlanticus (surface).
Munida subrugosa.
Oncinopus aranea.
Phoxichilidium patagonicum.
Ervilia subcancellata.
Limopsis minuta.
Pecten vitreus.
Dentalium entalis.
Murex (*Phyllonotus*) *zelandicus.*
Carbasea dissimilis.
Catenicella elegans.
Cribrilina monoceros.
Foveolaria elliptica.
Ichthyaria oculata.
Idmonea marionensis.
Membranipora galeata.
„ [*Amphiblestrum*] *umbonata.*
Myriozoum marionense.
Nellia oculata.
Ascidia meridionalis.
Sternoptyx diaphana (surface).

Of the 406 species taken only in this zone between 500 and 1000 fathoms, 351 species (or 86 per cent.) are new to science, and the following 33 new genera were taken only in this zone ;—

Phelloderma.
Aulochone (2).
Eurypiegma.
Tægeria.
Walteria.
Stachyodes.
Leptoptilum.
Microptilum.
Protocaulon.
Polysiphonia.
Astylus.
Bathelia.
Conopora.
Spinipora.
Sporadopora.
Rhodalia.
Cnemidaster.
Astroceras.
Ophioplyllum.
Argopatagus.
Cionobrissus.
Polynoëlla.
Trichopleon.
Pandalopsis.
Oorhynchus.
Gaza.
Amphitetrus.
Japetella.
Siphonicytara.
Cœlocormus.
Nannobrachium.
Omosudis.
Pteroidonus.

Except the genus *Aulochone* (which contains two species), these are all represented by a single species.

Notes on the Geographical Distribution.—An examination of the foregoing list shows that of the 631 species taken in this zone between 500 and 1000 fathoms, 356 species (or 56 per cent.) were taken south of the southern tropic, 282 species (or 45 per cent.) were taken within the tropics, and 164 species (or 26 per cent.) were taken north of the northern tropic; while 30 species (or 5 per cent.) were found to be common to all those three areas, 23 species (or 4 per cent.) were common to the southern and northern areas, 57 species (or 9 per cent.) were common to the southern and tropical areas, and 32 species (or 5 per cent.) were common to the tropical and northern areas.

6. Animals obtained in the dredgings and trawlings in depths between 100 and 500 fathoms.

The Challenger dredged or trawled at 40 Stations where the depth was between 100 and 500 fathoms, about 6000 specimens of invertebrates and fishes being procured, belonging to about 2050 species and about 865 genera. The total number of species and genera actually described and recorded in the Zoological Reports from the zone between these depths amounts to 1893 species and 776 genera, of which 1296 species (or 68 per cent.) and 168 genera (or 21 per cent.) are new to science, as shown in the following list. Those species taken by the Challenger in this zone only (numbering 1408 species, or 74 per cent.) are indicated by an asterisk thus.* The geographical distribution of the species is indicated by the heavy letters S, T, and N, used to denote that the species was taken *south* of the tropic of Capricorn (S), *between* the tropics of Capricorn and Cancer (T), or *north* of the tropic of Cancer (N.)

Keratosa:

* *Cacospongia intermedia*, n.sp. T
* ,, *levis*, n.sp. T
* ,, *spinifera*, n.sp. T
* *Stelospongos longispinus* (Fonbressin and Michelotti). T
* *Verongia tenuissima*, Hyatt. T

Monaxonida:

Acinella erecta (Carter). S
* *Clathria inanchorata*, n.sp. S
* *Desmacella annexa*, Schmidt. T
* *Desmacidon fruticosa* (Montagu). S
,, (?) *ramosa*, n.sp. S
Echinoclathria carteri, n.sp. S
* *Esperiopsis pulchella*, n.sp. T
* ,, *symmetrica*, n.sp. S
* *Gellius angulatus* (Bowerbank). N
,, *carduus*, n.sp. S
,, ,, var. *magellanica*, nov.
* ,, *glacialis*, n.sp. S
* ,, ,, var. *nivea*, nov.

* *Halichondria pelliculata*, n.sp. T
Iophon chelifer, n.sp. S
* ,, *cylindricus*, n.sp. S
* ,, *laminalis*, n.sp. S
* ,, (?) *omnivorus*, n.sp. S
* ,, *pattersoni* (Bowerbank). S
* *Myxilla cribrigera*, n.sp. S
* ,, *digitata*, n.sp. S
* ,, *fusca*, n.sp. S
* ,, *mollis*, n.sp. S
,, *nobilis*, n.sp. S
,, ,, var. *bacillifera*, nov.
,, ,, var. *patagonica*, nov.
* ,, *paucispinata*, n.sp. T
* *Pachychalina megalorrhaphis*, n.sp. S
Petrosia similis, n.sp. S T
* *Phakellia papyracea*, n.sp. S
,, *ventilabrum* (Johnston), var. *connexiva*, nov. S T
* *Plocamia coriacea* (Bowerbank), var. *elegans*, nov. N
* *Polymastia agglutinans*, n.sp. N
* *Raspailia* (?) *rigida*, n.sp. S
* *Reniera aquæductus*, Schmidt, var. *infundibularis*, nov. S
* ,, *implexa*, Schmidt. N
* ,, *subglobosa*, n.sp. S
* ,, *tufa*, n.sp. T
* *Rhizochalina singaporensis* (Carter). S
Stylocordyla stipitata (Carter), var. *globosa*, nov. S T N
Suberites carnosus (Johnston). S T N
* ,, *elongatus*, n.sp. N
* ,, *microstomus*, n.sp. S
,, *mollis*, n.sp. S
Tedania massa, n.sp. S
,, *tenuicapitata*, Ridley. S
* *Trachytedania patagonica*, n.sp. S
Vomerula esperioides, n.sp. S

Tetractinellida :

Anthastra communis, n.g., n.sp. S
,, *pulchra*, n.g., n.sp. S
* *Astrella vosmaeri*, n.g., n.sp. S
* *Astropeplus pulcher*, n.g., n.sp. T
* *Azorica marginata*, n.sp. T
* ,, *pfeifferæ*, Carter. T N
* *Callipelta ornata*, n.g., n.sp. T
* *Calthropella simplex*, n.g., n.sp. T
* *Characella aspera*, n.g., n.sp. T
* *Chrotella simplex*, n.g., n.sp. S
* *Corallistes bowerbanki* (Johnson). N
* ,, *masoni* (Bowerbank). T
* ,, *thomasi*, n.sp. T
* ,, *typus*, Schmidt. T
* *Craniella pulchra*, n.sp. S
* ,, *schmidtii*, n.sp. T
* *Cydonium hirsutus*, n.sp. T
* ,, *magellani*, n.sp. S
* *Discodermia panoplia*, n.sp. T
* *Dorypleres dendyi*, n.g., n.sp. T
* *Epallax callocyathus*, n.g., n.sp. T
* *Neosiphonia superstes*, n.g., n.sp. T
* *Pachastrella abyssi*, Schmidt. S
* *Pleroma turbinatum*, n.g., n.sp. T
* *Pœcillastra crassiuscula*, n.sp. T
* ,, *laminaris*, n.sp. T
* ,, *schulzii*, n.sp. S
* *Scleritoderma flabelliformis*, n.sp. T
* *Siphonidium capitatum*, n.sp. T
* *Sphinctrella cribrifera*, n.sp. T
* ,, *gracilis*, n.sp. T
* ,, *ornatus*, n.sp. T
* *Stelletta phrissens*, n.sp. S
* *Synops vosmaeri*, n.sp. T
* *Tetilla coronida*, n.sp. S
,, *grandis*, n.sp. S
,, ,, var. *alba*, nov.
* *Thenea grayi*, n.sp. S

Thenea schmidtii, n.n. T N
* *Thrombus challengeri*, n.g., n.sp. T
* *Tretolophus paniceus*, n.g., n.sp. T
* *Triptolemus cladosus*, n.g., n.sp. T

HEXACTINELLIDA :

* *Acanthascus dubius*, n.g., n.sp. S
* ,, *grossularia*, n.g., n.sp. S
Aphrocallistes bocagei, Wright. T N
* ,, *ramosus*, n.sp. T
* *Aulascus johnstoni*, n.g., n.sp. S
Aulocalyx irregularis, n.g., n.sp. S
* *Aulocystis zittelii* (Marshall). T
* *Bathydorus stellatus*, n.g., n.sp. S
* *Chonelasma* sp. (?). T
* *Crateromorpha murrayi*, n.sp. T
* ,, *thierfelderi*, n.sp. T
* ,, *tumida*, n.sp. T
* *Cyrtaulon solutus*, n.g., n.sp. N
Dactylocalyx (?) *patella*, n.sp. N
* *Eurete carteri*, n.sp. T
* ,, *farreopsis*, Carter. T
* ,, *marshalli*, n.sp. T
* ,, *schmidtii*, n.sp. T
* ,, *semperi*, n.sp. T
* *Farrea clavigera*, n.sp. T
,, *occa* (Bowerbank), Carter. S T
* ,, sp. (?). T
* *Fieldingia lagettoides*, Kent. T
* *Hexactinella lata*, n.sp. T
* *Hyalonema toxeres*, n.sp. T
* ,, (*Stylocalyx*) *apertum*, n.sp. N
* ,, (,,) *globus*, n.sp. T
* *Lanuginella pupa*, Schmidt. T
Lefroyella decora, n.g., n.sp. N
* *Mylinsia callocyathus*, Gray. T
* *Pheronema giganteum*, n.sp. T
* ,, *globosum*, n.sp. T
Polylophus philippinensis (Gray). T
* *Rhabdocalyptus roperi*, n.g., n.sp. S
Rossella antarctica, Carter. S
* *Sclerothamnus clausii*, Marshall. T
Semperella schultzei, Semper. T
* *Sympagella nux*, Schmidt. T
* Dictyonine. T
* Euretid. T

CALCAREA :

* *Amphoriscus elongatus*, n.sp. S
Eilhardia schulzei, n.g., n.sp. S
* *Leuconia crucifera*, n.sp. N
,, *fruticosa* (Haeckel). S
* ,, *levis*, n.sp. S
* *Leucosolenia blanca* (M.-Mackay), var. *bathybia*, nov. N
,, *poterium* (Haeckel). S
* *Ute argentea*, n.sp. S

ALCYONARIA :

* *Acamptogorgia arbuscula* (Gray, MS.). N
* *Acanella chiliensis*, n.sp. S
* ,, *eburnea* (Pourtalès). T
* ,, *rigida*, n.sp. T
* *Acanthogorgia laxa*, n.sp. S
* ,, *ramosissima*, n.sp. S
* ,, *ridleyi*, n.sp. S
* *Acis pustulata*, n.sp. N
* *Alcyonium haddoni*, n.sp. S
* *Amphilaphis regularis*, n.g., n.sp. S
* *Anthogorgia japonica*, n.sp. N
* *Anthomuricea argentea*, n.g., n.sp. S
* *Bellonella bocagei* (Kent). N
* *Caligorgia flabellum* (Ehrenberg). N
* ,, *sertosa*, n.sp. T
* *Callistephanus koreni*, n.g., n.sp. T
Ceratoisis grandiflora, Studer. T
* ,, *paucispinosa*, n.sp. N
* *Chironephthya crassa*, n.g., n.sp. N

* *Chironephthya dipsacea*, n.g., n.sp. N
* ,, *scoparia*, n.g., n.sp. N
* *Clavularia cylindrica*, n.sp. S
* ,, *tubaria*, n.sp. T
* *Clematissa obtusa*, n.g., n.sp. S
* ,, *robusta*, n.g., n.sp. S
* ,, *verrilli*, n.g., n.sp. S
Corallium rubrum, Lamarck. T
Dasygorgia axillaris, n.sp. S T
* ,, *cupressa*, n.sp. T
* ,, *flexilis*, n.sp. S
* ,, *geniculata*, n.sp. T N
* ,, *melanotrichos*, n.sp. T
* ,, *spiculosa*, Verrill. T
* *Echinogorgia ramulosa* (Gray). T
* *Eunephthya fusca*, n.sp. S
* *Eunicea palmata*, n.sp. S
* *Gorgonella orientalis*, n.sp. N
* *Juncella barbadensis*, Duchassaing and Michelotti. T
* ,, *racemosa*, n.sp. N
* *Keroeides koreni*, n.g., n.sp. N
* *Leptogorgia arbuscula* (Philippi). S
,, *purpurea* (Pallas). S T
* *Lophogorgia lutkeni*, n.sp. S
* *Melitodes nodosa*, n.sp. T N
* *Muriceides fragilis*, n.g., n.sp. T
* *Muricella complanata*, n.sp. N
* ,, *nitida*, Verrill. N
* ,, *perramosa*, Ridley. N
* ,, *tenera*, Ridley. T
* *Paramuricea laxa*, n.sp. S
* ,, *ramosa*, n.sp. S
* *Parisis fruticosa*, Verrill. T
* ,, *minor*, n.sp. N
* *Pleurocorallium secundum*, Dana. S T
* *Plumarella delicatissima*, n.sp. S
Primnoella australasiæ, Gray. S
* ,, *biserialis*, n.sp. S
* *Primnoella distans*, Studer. T
* ,, *flagellum*, Studer. S
* ,, *grandisquamis*, n.sp. S
* *Primoides sertularoides*, n.g., n.sp. S
* *Primnoisis antarctica* (Studer). S
Sarakka crassa, Danielssen. S
* *Scirpearella gracilis*, n.g., n.sp. T
* ,, *moniliforme*, n.g., n.sp. T
* ,, *profunda*, n.g., n.sp. T
* ,, *rubra*, n.g., n.sp. N
* *Siphonogorgia köllikeri*, n.sp. T
* ,, *pustulosa*, n.sp. T
* *Spongodes collaris*, n.sp. T
* ,, *laxa*, n.sp. T
* ,, *rhodosticta*, n.sp. T
* *Stenella johnsoni*, n.sp. T
* ,, *spinosa*, n.sp. S
* *Strophogorgia petersi*, n.g., n.sp. N
* *Suberogorgia köllikeri*, n.sp. N
* ,, *verriculata* (Esper). N
* *Sympodium glomeratum*, n.sp. S
* *Thouarella hilgendorfi* (Studer). T
* ,, *köllikeri*, n.sp. S
* ,, *variabilis*, n.sp. S
* ,, ,, var. *brevispina*, nov.
* ,, ,, var. *gracilis*, nov.
* *Villogorgia intricata* (Gray). T

PENNATULIDA :

* *Kophobelemnon ferrugineum*, n.sp. N
* *Pennatula moseleyi*, n.sp. S
* ,, *murrayi*, n.sp. T
* ,, *naresi*, n.sp. N
* *Stachyptilum macleari*, n.g., n.sp. T
* *Trichoptilum brunneum*, n.g., n.sp. T

ANTIPATHARIA :

* *Antipathella assimilis*, n.g., n.sp. S

* *Antipathella contorta*, n.g., n.sp. S
* ,, *minor*, n.g., n.sp. S
* ,, (?) *speciosa*, n.g., n.sp. S
* [*Antipathes*] *cylindrica*, n.sp. T
* *Aphanipathes cancellata*, n.g., n.sp. T
* ,, *sarothamnoides*, n.g., n.sp. T
* *Cladopathes plumosa*, n.g., n.sp. S
* *Dendrobrachia fallax*, n.g., n.sp. T
* *Schizopathes conferta*, n.g., n.sp. S
* *Taxipathes recta*, n.g., n.sp. T
* *Tylopathes crispa*, n.g., n.sp. S

ACTINIARIA:

* *Adamsia* (?) sp. T
* *Corynactis* (?) sp. T
* *Leiotealia nymphæa* (Drayton). S
Liponema multiporum, n.g., n.sp. S N
* *Phellia pectinata*, n.sp. S
,, *spinifera*, n.sp. S
* *Sagartia* sp. (?). T
* *Scytophorus striatus*, n.g., n.sp. S
* *Stephanactis tuberculata*, n.g., n.sp. N
* Actinian undetermined. T

CORALS:

* *Acanthocyathus dentatus*, n.sp. T
* ,, *spinicarens*, n.sp. T
Astræa abyssorum, n.sp. T
* *Axohelia dumetosa*, Duchassaing. N
* *Balanophyllia cornu*, n.sp. T
* ,, *malaccensis*, Kent. T
* ,, *parvula*, n.sp. T
* ,, *redivira*, n.sp. T
Bathyactissymmetrica (Pourtalès). S T N
* *Caryophyllia clavus*, Scacchi, var. *borealis*, Duncan. S T N
* ,, ,, ,, var. *epithecata*, Duncan.
* *Caryophyllia clavus*, Scacchi, var. *smithi*, Duncan.
* ,, ,, ,, var. *transversalis*, nov.
,, *communis* (Seguenza). S N
* ,, *cylindracea*, Reuss. N
* ,, *lævicostata*, n.sp. T
,, *maculata* (Pourtalès). S T
* ,, *paucipalata*, n.sp. T
* ,, *profunda*, n.sp. S T
* ,, *rugosa*, n.sp. T
Cladocora arbuscula, M.-Edwards and Haime. S N
Cryptohelia pudica, M.-Edwards and Haime. S T N
Cyathoceras cornu, n.g., n.sp. S
* ,, *rubescens*, n.g., n.sp. T
Deltocyathus italicus, M.-Edwards and Haime. S T N
,, ,, var. *calcar*, nov.
* ,, *magnificus*, n.sp. T
Dendrophyllia cornigera, Blainville. T
* *Desmophyllum cailleti*, Duchassaing and Michelotti. T
* ,, *eburneum*, n.sp. S
* ,, *ingens*, n.sp. S
Errina labiata, n.sp. S
Flabellum apertum, n.sp. S N
* ,, *australe*, n.sp. S
* ,, *japonicum*, n.sp. N
* ,, *patagonichum*, n.sp. S
* ,, *patens*, n.sp. T
* *Lophohelia arbuscula*, n.sp. T
* ,, *candida*, n.sp. T
* ,, *prolifera*, M.-Edwards and Haime. S T
* ,, *tenuis*, n.sp. T
* *Odontocyathus coronatus* (Pourtalès). T
* *Pleurocyathus brunneus*, n.g., n.sp. T

* *Pliobothrus symmetricus*, Pourtalès. T
* *Rhizotrochus fragilis*, Pourtalès. S T
Solenosmilia variabilis, Duncan. S T
* *Sphenotrochus rubescens*, n.sp. T
Stenohelia profunda, n.sp. S T
* *Stephanophyllia complicata*, n.sp. T
* ,, *formosissima*, n.sp. T
* *Stephanotrochus platypus*, n.g., n.sp. S
* *Stylaster duchassaingi*, Pourtalès. T
* *Thecopsammia elongata*, n.sp. T
* ,, *gemma*, n.sp. T

HYDROIDA :

* *Aglaophenia acacia*, n.sp. N
* ,, *filicula*, n.sp. N
* *Antennularia fascicularis*, n.sp. S
* *Campanularia tulipifera*, n.sp. S
* *Cryptolaria crassicaulis*, n.sp. T
* ,, *flabellum*, n.sp. T
* ,, *geniculata*, n.sp. T
* *Diphasia pinaster* (Ellis and Solander). N
* *Eudendrium rameum* (Pallas). S
* *Halecium arboreum*, n.sp. S
* ,, *beanii*, Johnston. S N
* ,, *fastigiatum*, n.sp. S
* *Hypopyxis labrosa*, n.g., n.sp. S
* *Lafoëa dumosa* (Fleming). T
* *Lictorella cyathifera*, n.g., n.sp. T
* *Perisiphonia filicula*, n.g., n.sp. S N
* *Plumularia abietina*, n.sp. S
* ,, *insignis*, n.sp. S
* ,, *laxa*, n.sp. S
* *Plumularia stylifera*, n.sp. S
* *Polyplumaria pumila*, n.sp. N
* *Sertularia catena*, n.sp. T
* ,, *laxa* [*exigua*], n.sp. N
* ,, *leiocarpa*, n.sp. S
* *Staurotheca dichotoma*, n.g., n.sp. S
* *Streptocaulus pulcherrimus*, n.g., n.sp. T
* *Thuiaria pharmacopola*, n.sp. N

SIPHONOPHORÆ :

* *Stephonalia bathyphysa*, n.g., n.sp. S

CRINOIDEA :

Actinometra pulchella (Pourtalès). T
* ,, *stelligera*, n.sp. T
* *Antedon angustiradia*, n.sp. T
* ,, *australis*, n.sp. S
,, *compressa*, n.sp. T
* ,, *discoidea*, n.sp. T
* ,, *distincta*, n.sp. T
* ,, *exigua*, n.sp. S
* ,, *flexilis*, n.sp. T
* ,, *hirsuta*, n.sp. S
* ,, *latipinna*, n.sp. N
* ,, *longicirri*, n.sp. T
* ,, *manca*, n.sp. T
,, *multispina*, n.sp. S T
* ,, *parvipinna*, n.sp. T
* ,, *patula*, n.sp. T
* ,, *porrecta*, n.sp. T
* ,, *pusilla*, n.sp. T
* ,, *quinquecostata*, n.sp. T
* ,, *rhomboidea*, n.sp. S
* ,, *robusta*, n.sp. T
* ,, *spinicirra*, n.sp. S
* ,, *tenuicirra*, n.sp. T
* ,, *tuberosa*, n.sp. T
* *Atelecrinus balanoides*, n.sp. T
Eudiocrinus semperi, n.g., n.sp. S
* *Metacrinus angulatus*, n.g., n.sp. T
* ,, *cingulatus*, n.g., n.sp. T
* ,, *nobilis*, n.g., n.sp. T
* ,, *tuberosus*, n.g., n.sp. T
Pentacrinus alternicirrus, n.sp. S T
* ,, *macleayanus*, n.sp. T

Pentacrinus naresianus, n.sp. S T
Rhizocrinus lofotensis, Sars. S T

ASTEROIDEA :

Archaster typicus, Müller and Troschel. T
* *Asterias* (*Cosmasterias*) *sulcifera* (Valenciennes, MS.), Perrier. S
* ,, (*Smilasterias*) *triremis*, n.sp. S
* ,, (*Stolasterias*) *eustyla*, n.sp. S
* ,, (,,) *stichantha*, n.sp. N
* *Astropecten acanthifer*, n.sp. T
* ,, *brevispinus*, n.sp. N
* ,, *cingulatus*, n.sp. T
* ,, *hæmatophilus*, n.sp. N
* ,, *imbellis*, n.sp. T
Bathybiaster loripes, n.sp. S
,, ,, var. *obesa*, nov.
* *Brisinga cricophora*, n.sp. T
* *Calyptraster coa*, n.g., n.sp. T
Chataster longipes (Retzius), Sars. N
* *Cribrella compacta*, n.sp. S
,, *obesa*, n.sp. S
* ,, *præstans*, n.sp. S
,, *simplex*, n.sp. S
* *Crossaster penicillatus*, n.sp. S
* *Ctenodiscus procurator*, n.sp. S
Gnathaster elongatus, n.g., n.sp. S
,, *meridionalis* (Smith). S
Labidiaster annulatus, n.sp. S T
* *Leptagonaster cristatus*, n.g., n.sp. T
* *Leptoptychaster antarcticus*, n.sp. S
* *Lophaster stellans*, n.sp. S
Luidia aspera, n.sp. T
* *Mimaster cognatus*, n.sp. S
* *Nymphaster bipunctus*, n.g., n.sp. T
,, *symbolicus*, n.g., n.sp. T
,, ,, var. *breviradiata*, nov.
* *Ophidiaster attenuatus*, Gray. N
* *Ophidiaster ophidianus* (Lamarck), Agassiz. N
* *Palmipes diaphanus*, n.sp. T
* *Paragonaster ctenipes*, n.g., n.sp. T
Pararchaster armatus, n.g., n.sp. N
* ,, *spinosissimus*, n.g., n.sp. N
* *Pedicellaster hypernotius*, n.sp. S
* *Pentagonaster arcuatus*, n.sp. N
* ,, *japonicus*, n.sp. N
,, *patagonicus*, n.sp. S
* *Perknaster densus*, n.g., n.sp. S
* *Pholidaster distinctus*, n.g., n.sp. T
* ,, *squamatus*, n.g., n.sp. T
* *Plutonaster ambiguus*, n.g., n.sp. S
* ,, *marginatus*, n.g., n.sp. T
* *Pontaster oxyacanthus*, n.g., n.sp. N
* ,, *planeta*, n.g., n.sp. S
* ,, *subtuberculatus*, n.g., n.sp. S
* ,, *teres*, n.g., n.sp. T
Porania antarctica, Smith. S
,, *spiculata*, n.sp. S T
* *Pseudarchaster discus*, n.g., n.sp. S
Psilaster acuminatus, n.g., n.sp. S
* *Pteraster rugatus*, n.sp. S
* ,, *stellifer*, n.sp. S
* *Retaster gibber*, n.sp. S
* ,, *peregrinator*, n.sp. S
* *Solaster paxillatus*, n.sp. N
* ,, *regularis*, n.sp. S
* ,, *subarcuatus*, n.sp. S
Stichaster felipes, n.sp. S
* ,, *polygrammus*, n.sp. S
* *Tarsaster stoichodes*, n.g., n.sp. T

OPHIUROIDEA :

Amphilepis norvegica, Ljungman. N
* *Amphiura angularis*, n.sp. S
,, *bellis*, n.sp. T N
,, *glauca*, n.sp. N

Amphiura squamata (Delle Chiaje), Sars. S
,, *studeri*, Lyman. S
* ,, sp. (?). S
* *Astroclon propugnatoris*, n.g., n.sp. T
Astronyx loveni, Müller and Troschel. N
* *Astroschema brachiatum*, n.sp. N
* ,, *rubrum*, n.sp. S
* ,, *tumidum*, n.sp. T
Astrotoma agassizii, Lyman. S
* ,, *murrayi*, n.sp. T
Gorgonocephalus pourtalesii, Lyman. S
Ophiacantha abnormis, n.sp. T
,, *cosmica*, n.sp. S T
* ,, *cuspidata*, n.sp. T
* ,, *granulosa*, n.sp. T
,, *imago*, n.sp. S
,, *rosea*, n.sp. S N
* ,, *serrata*, n.sp. T
* ,, *stimulea*, n.sp. S
* ,, *troscheli*, n.sp. N
* ,, *tuberculosa*, n.sp. T
* ,, *valenciennesi*, n.sp. T
* ,, *vivipara*, Ljungman. S
* ,, three species undetermined. S
Ophiactis asperula (Phil.). S
,, *flexuosa*, n.sp. S
* ,, *hirta*, n.sp. S
* ,, *mülleri*, Lütken. T
* ,, *plana*, Lyman. S
Ophiocamax vitrea, n.g., n.sp. T
Ophioceramis (?) *obstricta*, n.sp. S T
Ophiochiton fastigatus, n.g., n.sp. T N
* *Ophiocnida scabra*, n.sp. T
* *Ophiocoma* sp. (?). S
* *Ophioconis antarctica*, n.sp. S
* ,, *pulverulenta*, n.sp. T
* *Ophiocopa spatula*, n.g., n.sp. T
* *Ophiocreas carnosus*, n.sp. S
* ,, *caudatus*, n.sp. N
,, *œdipus*, n.sp. T
Ophiocten amitinum, n.sp. S
* *Ophioglypha acervata*, Lyman. T
,, *confragosa*, n.sp. S N
,, *costata*, n.sp. S
,, *deshayesi*, n.sp. S
* ,, *elevata*, n.sp. S
* ,, *falcifera*, Lyman. T
* ,, *flagellata*, n.sp. N
* ,, *imbecillis*, n.sp. N
,, *irrorata*, n.sp. S
,, *jejuna*, n.sp. S
,, *lepida*, n.sp. T N
* ,, *ljungmani*, n.sp. T
,, *lymani*, Ljungman. S
* ,, *palliata*, n.sp. S
* ,, *ponderosa*, n.sp. N
* ,, *solida*, n.sp. T
* ,, *undata*, n.sp. T
,, *variabilis*, n.sp. T
* ,, sp. (?). S
Ophiolebes scorteus, n.g., n.sp. S
* ,, *vestitus*, n.g., n.sp. S
Ophiomastus tegulitius, n.g., n.sp. S T
* ,, *texturatus*, n.g., n.sp. T
* ,, sp. (?). S
Ophiomitra chelys, n.sp. N
* ,, *dipsacos*, n.sp. T
,, *normani*, n.sp. N
Ophiomusium cancellatum, n.sp. N
* ,, *laqueatum*, n.sp. T
* ,, *lunare*, n.sp. T
* ,, *lütkeni*, n.sp. T
,, *lymani*, Wyville Thomson. S T N
* ,, *planum*, Lyman. N
,, *pulchellum*, n.sp. S T N

* *Ophiomusium serratum*, n.sp. T
* ,, *simplex*, n.sp. T
* ,, *validum*, Ljungman. T
Ophiomyxa australis, Lütken. S T
,, *vivipara*, Studer. S
Ophionereis dubia (Müller and Troschel). T N
* *Ophiopeza æqualis*, n.sp. T
* ,, *aster*, n.sp. S
* ,, *yoldii*, Lütken. S
* *Ophiopyren brevispinus*, n.g., n.sp. T
* ,, *longispinus*, n.g., n.sp. T N
* *Ophiopyrgus wyville-thomsoni*, n.g., n.sp. T
* *Ophiosciasma attenuatum*, n.g., n.sp. T
* *Ophioscolex dentatus*, n.sp. S
* ,, *tropicus*, n.sp. T
* *Ophiothamnus remotus*, n.sp. S
* ,, *vicarius*, Lyman. T
Ophiothrix aristulata, n.sp. S
,, *berberis*, n.sp. T
,, *capillaris*, n.sp. T
* ,, *lütkeni*, Wyville Thomson. N
* *Ophiozona antillarum*, n.sp. T
* ,, (?) *dubia*, Lyman. T
* ,, *insularia*, n.sp. T
* ,, *nivea*, Lyman. T

ECHINOIDEA :

Aerope rostrata, n.g., n.sp. T N
Arbacia dufresnei (Bl.). S
Aspidodiadema microtuberculatum, n.g., n.sp. S T
Asthenosoma coriaceum, n.sp. T
,, *gracile*, n.sp. S T
,, *pellucidum*, n.sp. T
* ,, *tessellatum*, n.sp. T
Brissopsis lyrifera (Gray). S T N
,, *lyrifera* (Forbes). S
* *Brissus damesi*, n.sp. T N
* *Catopygus recens*, n.sp. T
* *Cœlopleurus maillardi* (Michelin). T
* *Cottaldia forbesiana*, n.sp. T
Dorocidaris (*Cidaris*) *bracteata*, n.sp. T
,, (,,) *papillata* (Leske). S T N
Echinanthus testudinarius, Gray. S
* *Echinocardium flavescens* (Müller). S
* *Echinocyamus pusillus* (Müller). T
* *Echinolampas oviformis* (Gmelin). T
Echinus acutus, Lamarck. S T N
,, *elegans*, Düben and Koren. S T N
* ,, *horridus*, n.sp. S
,, *magellanicus*, Phil. S
,, *margaritaceus*, Lamarck. S
,, *norvegicus*, Düben and Koren. S N
Fibularia australis, Desmoulins. S
Goniocidaris canaliculata, Agassiz. S
* ,, *florigera*, n.sp. T
Hemiaster cavernosus (Phil.). S
,, *gibbosus*, n.sp. T N
* *Homolampas fragilis*, Agassiz. T
* *Linopneustes murrayi*, n.g., n.sp. T N
Maretia alta, Agassiz. T
Micropyga tuberculata, n.g., n.sp. T
* *Moiropsis claudicans*, n.g., n.sp. T
* *Palæotropus loveni*, n.sp. T
Peronella decagonalis (Lesson). T
Phormosoma bursarium, n.sp. T N
,, *hoplacantha*, n.sp. S N
,, *luculentum*, n.sp. T
* *Podocidaris sculpta*, Agassiz. T
Porocidaris elegans, n.sp. S T
Pourtalesia laguncula, n.sp. S T N
Prionechinus sagittiger, n.g., n.sp. S T
Salenia hastigera, n.sp. S T N
,, *varispina*, Agassiz. T N
Salmacis dussumieri, Agassiz. T
Schizaster fragilis (Düben and Koren). S N

Schizaster moseleyi, n.sp. S
* ,, *ventricosus*, Gray. N
Spatangus raschi, Lovén. S
Temnopleurus hardwicki (Gray). T N
* ,, *reynaudi*, Agassiz. S T

HOLOTHURIOIDEA :

* *Ankyroderma danielsseni*, n.sp. S
* ,, *simile*, n.sp. N
* *Chirodota* sp. (?). T
Cucumaria capensis, n.sp. S
,, *serrata*, n.sp. S
,, ,, var. *intermedia*, nov.
Holothuria atra, Jæger. T
,, *murrayi*, n.sp., var. *parva*, nov. S T N
Ilyodæmon maculatus, n.g., n.sp. T
* *Lætmogone violacea*, n.g., n.sp. S
,, *wyville-thomsoni*, n.g., n.sp. S N
* *Orphnurgus asper*, n.g., n.sp. T
Pannychia moseleyi, n.g., n.sp. S
Pseudostichopus mollis, n.g., n.sp. S
Psolus antarcticus, Philippi. S
* ,, *disciformis*, n.sp. S
,, *ephippifer*, n.sp. S
,, *incertus*, n.sp. S
* ,, *squamatus*, Düben and Koren. S
* *Stichopus moseleyi*, n.sp. S
* *Synapta aculeata*, n.sp. N
,, *beselii*, Jæger. T
* ,, *challengeri*, n.sp. T
* *Trochostoma antarcticum*, n.sp. S
,, *violaceum*, Studer. S
* ,, (?) sp. S

NEMERTEA :

Amphiporus marioni, n.sp. S
Cerebratulus macroren, n.sp. S N
* *Cerebratulus* sp. (?). N
* *Eupolia nipponensis*, n.g., n.sp. N

GEPHYREA :

* *Chætoderma militare*, n.sp. T

ANNELIDA :

* *Allmaniella setubalensis*, n.g., n.sp. N
* *Ampharete kerguelensis*, n.sp. S
* ,, *sombreriana*, n.sp. T
* *Amphicteis japonica*, n.sp. N
* *Aphrodita echidna*, Quatrefages.
* ,, *intermedia*, n.sp. T
* *Apomatus elisabethæ*, n.sp. S
* *Chætozone atlantica*, n.sp. T
* *Dasychone capensis*, n.sp. S
Ditrypa arietina, Müller. N
* *Ereutho kerguelensis*, n.sp. S
Eulagisca corrientis, n.g., n.sp. S
* *Eulepis challengeriæ*, n.sp. T
* ,, *wyvillei*, n.sp. N
* *Eunice edwardsi*, n.sp. S
,, *magellanica*, n.sp. S
* ,, *prognatha*, n.sp. T
,, *pycnobranchiata*, n.sp. S
* *Eunoa iphionoides*, n.sp. S
,, *opalina*, n.sp. S
* ,, *yedoensis*, n.sp. N
* *Eunotomastus grubei*, n.g., n.sp. N
* *Euphione elisabethæ*, n.g., n.sp. S
* *Eupolynoë mollis*, M'Intosh. S
* *Eusyllis kerguelensis*, n.sp. S
* *Euthelepus setubalensis*, n.g., n.sp. N
* *Glycera capitata*, Œrsted. N
* ,, *kerguelensis*, n.sp. S
* ,, *tesselata*, Grube. N
* *Hemipodus* (?) *magellanicus*, n.sp. S
Hyalinœcia tubicola, Müller, var. *longibranchiata*, nov. S T N

* *Lætmonice japonica*, n.sp. N
,, *producta*, Grube, var. *wyrillei*, nov. S T N
* *Lagisca antarctica*, n.sp. S
* ,, *darwini*, n.sp. S
* ,, *magellanica*, n.sp. S
* ,, ,, var. *grubei*, nov.
* ,, ,, ,, *murrayi*, nov.
* *Leanira areolata*, n.sp. N
* ,, *magellanica*, n.sp. S
* *Leaniricola rotundata*, n.g., n.sp. [Crustacean parasite on *L. areolata*.] N
* *Lepidonotus squamatus* (Linné). N
* *Lumbriconereis bifurcata*, n.sp. N
* ,, *japonica*, Marenzeller. N
* ,, *kerguelensis*, Grube. S
* *Macduffia bonhardi*, n.g., n.sp. T
* *Maldane* (?) *atlantica*, n.sp. T
* ,, *sarsi*, Malmgren. N
* *Melinna maculata*, Webster. T
* *Nematonereis schmardæ*, n.sp. T
Neottis antarctica, M'Intosh. S
* *Nephthys malmgreni*, Théel. N
* *Nicomache japonica*, n.sp. N
* *Nothria macrobranchiata*, n.sp. N
* ,, *sombreriana*, n.sp. T
,, *tenuisetis*, n.sp. S T
* ,, *willemoesii*, n.sp. T
* *Notomastus* (?) sp. S
* *Phyllodoce duplex*, n.sp. S
* *Pista sombreriana*, n.sp. T
* *Placostegus assimilis*, n.sp. N
* *Polycirrus kerguelensis*, n.sp. S
* *Polycunoa lævis*, n.g., n.sp. S
Polynoë platycirrus, n.sp. S
* *Pomatoceros strigiceps*, Mörch. S
* *Praxilla assimilis*, n.sp. S
* ,, (?) *challengerii*, n.sp. N
* ,, *kerguelensis*, n.sp. S
* *Praxilla köllikeri*, n.sp. T
* ,, *lankesteri*, n.sp. N
* *Protula capensis*, n.sp. S
* ,, *lusitanica*, n.sp. N
* *Psammolyce occidentalis*, n.sp. T
* *Scalisetosus ceramensis*, n.g., n.sp. T
* *Scolecolepis cirrata*, Sars. S T
* *Scoloplos kerguelensis*, n.sp. S
Serpula narconensis, Baird, var. *magellanica*, nov. S
* ,, *sombreriana*, n.sp. T
* *Sigalion buskii*, M'Intosh. N
* *Sphærosyllis kerguelensis*, n.sp. S
* *Spirobranchus occidentalis*, n.sp. N
* *Spirorbis* sp. (?). S
* *Syllis brasiliensis*, n.sp. T
* ,, *ramosa*, n.sp. T
* ,, *setubalensis*, n.sp. N
* *Terebella grubei*, n.sp. S
,, (*Lanice*) *flabellum*, Baird. S
* *Terebellides ehlersi*, n.sp. T
,, *strœmii*, Sars, var. *kerguelensis*, nov. S N
* *Trophonia kerguelarum*, Grube. S

MYZOSTOMIDA :

* *Myzostoma beardi*, n.sp. T
* ,, *folium*, n.sp. T
* ,, *inflator*, n.sp. T
,, *murrayi*, n.sp. S T
,, *willemoesii*, n.sp. S T
,, *wyville-thomsoni*, n.sp. T
* ,, sp. (?). T

OSTRACODA :

Argillæcia eburnea, n.sp. S
* *Asterope* sp. (?). N

Bairdia amygdaloides, Brady. S T
* ,, *angulata*, Brady. S T N
,, *attenuata*, n.sp. T
,, *formosa*, Brady. T N
,, *foveolata*, Brady. S T N
,, *ovata*, Bosquet. S
,, *victrix*, Brady. S T N
,, *villosa*, n.sp. S
* ,, sp. (?). S
Bythocypris reniformis, n.g., n.sp. S T
* *Cypridina danæ*, n.sp. S
* *Cythere arata*, n.sp. S
* ,, *bermudæ*, Brady. N
* ,, *cytheropteroides*, n.sp. S
,, *dasyderma*, n.sp. S T N
,, *dictyon*, n.sp. S T N
,, *foveolata*, n.sp. S
,, *fungoides* (Brady). T N
,, *impluta*, n.sp. S
* ,, *inconspicua*, n.sp. T
* ,, (?) *laganella*, n.sp. T
,, *lepralioides*, n.sp. S
,, *normani*, Brady. S
* ,, *parallelogramma*, n.sp. S
* ,, *patagoniensis*, n.sp. S
* ,, *polytrema*, Brady. S
,, *rastromarginata*, n.sp. S T
* ,, *scalaris*, n.sp. S T
,, *scutigera*, Brady. S T
* ,, *securifer*, n.sp. S
,, (?) *serratula*, n.sp. S T N
,, *speyeri*, Brady. T
,, *subrufa*, n.sp. S
,, *suhmi*, n.sp. S N
* ,, *torresi*, n.sp. T
,, *wyville-thomsoni*, n.sp. S T
* *Cytherella irregularis*, n.sp. N
,, *lata*, n.sp. T N
* ,, *latimarginata*, n.sp. T
Cytherella pulchra, Brady. S T N
,, *punctata*, Brady. S T
* ,, *truncata*, Brady. T
* ,, sp. (?). S
Cytheridea spinulosa, Brady. T
Cytheropteron angustatum, n.sp. S T
,, *assimile*, n.sp. S
,, *fenestratum*, n.sp. S
* ,, *patagoniense*, n.sp. S
* *Cytherura cribrosa*, n.sp. S
Krithe bartonensis (Jones). S T
,, *producta*, n.sp. S T N
Macrocypris decora, Brady. S T
,, *similis*, n.sp. S T
* ,, *tenuicauda*, n.sp. T
Paracypris polita, Sars. S T N
Polycope orbicularis, Sars. S T N
* *Pontocypris trigonella*, Sars. N
Pseudocythere caudata, Sars. S
* ,, *fuegiensis*, n.sp. S
Xestoleberis curta, Brady. S T N
,, *depressa*, Sars. S
,, *setigera*, n.sp. S
* *Xiphichilus complanatus*, n.sp. S

CIRRIPEDIA :

* *Alepas pedunculata*, n.sp. S
* *Balanus corolliformis*, n.sp. S
* ,, *tenuis*, n.sp. T
* *Megalasma striatum*, n.g., n.sp. T
* *Pœcilasma carinatum*, n.sp. T
* ,, *gracile*, n.sp. S
* *Scalpellum africanum*, n.sp. S
* ,, *balanoides*, n.sp. T
,, *elongatum*, n.sp. S
* ,, *indicum*, n.sp. T
,, *intermedium*, n.sp. S
* ,, *pedunculatum*, n.sp. S

* *Scalpellum recurvirostrum*, n.sp. S
* ,, *rubrum*, n.sp. T

Amphipoda :

* *Acanthechinus tricarinatus*, n.g., n.sp. S
* *Eginella tristanensis*, n.sp. S
* *Ampelisca abyssicola*, n.sp. T
* ,, *chiltoni*, n.sp. S
* ,, *fusca*, n.sp. S
* *Amphilochus marionis*, n.sp. S
* *Atylopsis emarginatus*, n.g., n.sp. S
* *Autonoe kergueleni*, n.sp. S
* *Caprellinoides tristanensis*, n.g., n.sp. S
* *Cerapus sismithi*, n.sp. S
* *Cheirimedon crenatipalmatus*, n.g., n.sp. S
* *Dodecas elongata*, n.g., n.sp. S
Eusirus longipes, Boeck. S
* *Gammaropsis afra*, n.sp. S
* *Iphimedia pacifica*, n.sp. S
* *Kergueleuia compacta*, n.g., n.sp. S
* *Lætmatophilus purus*, n.sp. S
* *Lanceola* sp. (?). T
* *Lepidepecreum foraminiferum*, n.sp. S
* *Leucothoë miersi*, n.sp. S
* *Mæra bruzelii*, n.sp. S
,, *rubromaculata*, Stimpson. S
Metopa crenatipalmata, n.sp. S
,, *nasutigenes*, n.sp. S
* *Neohela serrata*, n.sp. S
* *Œdiceroides rostrata*, n.g., n.sp. S
* *Pardalisca marionis*, n.sp. S
Phoxocephalus kergueleni, n.sp. S
* *Phronima sedentaria* (Forskål). N
* *Platophium danæ*, n.sp. S
* *Platyscelus rissoinæ*, Spence Bate. T
* *Podocerus tristanensis*, n.sp. S
* *Stenothoë adhærens*, n.sp. S
* *Syrrhoë papyracea*, n.sp. T
* *Tryphosa antennipotens*, n.sp. S
* *Urothoë lachneëssa*, n.sp. S

Isopoda :

* *Anceus gigas*, n.sp. S
* *Apseudes antarctica*, n.sp. S
* *Arcturides cornutus*, Studer. S
* *Arcturus purpureus*, n.sp. T
,, *furcatus*, Studer. S
Astacilla marionensis, n.sp. S
* *Astrurus crucicauda*, n.g., n.sp. S
* *Cymodocea darwini*, Cunningham. S
* *Ilyarachna quadrispinosa*, n.sp. S
* *Jæropsis marionis*, n.sp. S
* *Janira tristani*, n.sp. S
* *Leptognathia australis*, n.sp. S
* *Munnopsis latifrons*, n.sp. T
Neasellus kerguelensis, n.g., n.sp. S
* *Paranthura neglecta*, n.sp. S
* *Paratanais dimorphus*, n.sp. S
* *Pleurogonium albidum*, n.sp. S
* ,, *minutum*, n.sp. S
* ,, *serratum*, n.sp. S
Serolis antarctica, n.sp. S T
,, *bromleyana*, n.sp. S
,, *latifrons*, White. S
,, *septemcarinata*, Miers. S
* *Tanais hirsutus*, n.sp. S
* *Typhlapseudes nereus*, n.g., n.sp. T
Typhlotanais kerguelenensis, n.sp. S N

Cumacea :

* *Campylaspis nodulosa*, n.sp. S
* *Diastylis horrida*, n.sp. S
* *Leucon assimilis*, n.sp. S
* *Paralamprops serrato-costata*, n.g., n.sp. S
* *Vaunthompsonia meridionalis*, n.sp. S

STOMATOPODA :

* *Squilla leptosquilla*, n.sp. T

SCHIZOPODA :

Boreomysis obtusata, n.sp. N
* *Gnathophausia longispina*, n.g., n.sp. T
Lophogaster typicus, Sars. S
Pseudomma sarsii, n.sp. S

MACRURA :

* *Acanthephyra angusta*, n.sp. T
* ,, *approxima*, n.sp. S
* ,, *armata*, M.-Edwards. T
,, *brachytelsonis*, n.sp. S T N
* ,, *carinata*, n.sp. S
,, *sica*, n.sp. S T N
* *Amphiplectus depressus*, n.g., n.sp. T
* *Arctus sordidus*, Stimpson. T
* *Aristeus rostridentatus*, n.sp. T
Benthesicymus altus, n.g., n.sp. S T N
,, *brasiliensis*, n.g., n.sp. S T
,, *pleocanthus*, n.g., n.sp. T
* *Callianassa occidentalis*, n.sp. T
* *Campylonotus capensis*, n.g., n.sp. S T
* ,, *semistriatus*, n.g., n.sp. S
* ,, *vagans*, n.g., n.sp. S
* *Cheiroplatea cenobita*, n.g., n.sp. T
* *Cheramus occidentalis*, n.g., n.sp. T
* *Chlorotocus incertus*, n.sp. S
* *Chorismus tuberculatus*, n.g., n.sp. S
* *Eiconaxius acutifrons*, n.g., n.sp. T
Gennadas parvus, n.g., n.sp. S T N
* *Glyphocrangon hastacauda*, n.sp. N
,, *regalis*, n.sp. S T
* *Haliporus equalis*, n.g., n.sp. T
Hemipenæus semidentatus, n.g., n.sp. S T
* ,, *tomentosus*, n.g., n.sp. T
* ,, *virilis*, n.g., n.sp. T
Heterocarpus alphonsi, n.sp. T N
* ,, *dorsalis*, n.sp. T
* ,, *ensifer*, M.-Edwards. T
* ,, *lævigatus*, n.sp. T
* *Ibaccus alticrenatus*, n.sp. S
* ,, *brevipes*, n.sp. T
,, *verdi*, n.sp. T
* *Merhippolyte agulhasensis*, n.g., n.sp. S
Nauticaris marionis, n.g., n.sp. S
Nematocarcinus productus, n.sp. T N
,, *tenuipes*, n.sp. T N
,, *undulatipes*, n.sp. S T
* *Nephrops thomsoni*, n.sp. S T
* *Nothocaris geniculatus* (M.-Edwards). T
* ,, *rostricrescentis*, n.g., n.sp. T
* *Palæmonella orientalis*, Dana. T
Palinosytus (*Palinostus*) *lalandii* (Lamarck). S
* *Pandalus magnoculus*, n.sp. S
* ,, *modestus*, n.sp. S
* *Panulirus angulatus*, n.sp. T
Pasiphæa acutifrons, n.sp. S N
* ,, *cristata*, n.sp. T
Penæus fissurus, n.sp. T
,, *philippinensis*, n.sp. T
,, *rectacutus*, n.sp. T
,, *serratus*, n.g., n.sp. T
Pentacheles euthrix, n.g., n.sp. S T
* *Philonicus* (*Pleoticus*) *lucasii*, n.g., n.sp. T
* *Platybema rugosum*, n.g., n.sp. T
* *Plesionika brevirostris*, n.g., n.sp. T
,, *semilævis*, n.g., n.sp. S T
* ,, *spinipes*, n.g., n.sp. T
* ,, *unidens*, n.g., n.sp. T
* ,, *uniproducta*, n.g., n.sp. T
* *Polycheles baccata*, n.sp. T
* ,, *crucifera*, n.sp. T
* *Pontocaris propensalata*, n.g., n.sp. T
* *Pontophilus junceus*, n.sp. T

Sergestes atlanticus, M-Edwards. S T N
,, *japonicus*, n.sp. T N
* *Sicyonia lævis*, n.sp. T
* *Stereomastis suhmi*, n.g., n.sp. S
* *Stylodactylus bimaxillaris*, n.sp. T
* *Systellaspis lanceocaudata*, n.g., n.sp. N
* *Thaumastocheles zaleuca*, n.sp. T

ANOMURA:

* *Clibanarius* (?) sp. T
* *Cryptodromia incisa*, n.sp. S
,, *lateralis* (Gray). S
* *Dromidia bicornis*, Studer. S
* *Elasmonotus armatus*, M.-Edwards. T
* ,, *asper*, n.sp. S
* ,, *debilis*, n.sp. T
* ,, *lævigatus*, n.sp. T
* ,, *miersii*, n.sp. T
* *Eudromia frontalis*, n.g., n.sp. S
* *Eumunida smithii*, n.sp. T
Eupagurus comptus (White), var. *jugosa*, nov. S
,, *lacertosus*, n.sp. S
* ,, *occlusus*, n.sp. T
* ,, *spinulentus*, n.sp. T
* ,, *tristanensis*, n.sp. S
* *Galathea inconspicua*, n.sp. T
* ,, *pusilla*, n.sp. S
* ,, *subsquamata*, Stimpson. T
* *Glaucothoë carinata*, n.sp. S
Homola orientalis, n.sp. T
Latreillia australiensis, n.sp. S
* *Lithodes murrayi*, n.sp. S
Lyreidus tridentatus, De Haan. S T
* *Munida gracilis*, n.sp. S
* ,, *granulata*, n.sp. T
* ,, *haswelli*, n.sp. S
* *Munida incerta*, n.sp. T
* ,, *inornata*, n.sp. T
,, *microphthalma*, M.-Edwards. S T
* ,, *miles*, M.-Edwards. T
* ,, *militaris*, n.sp. T
* ,, ,, var. *curvirostris*, nov.
* ,, *normani*, n.sp. T
* ,, *proxima*, n.sp. T
* ,, *scabra*, n.sp. T
* ,, *spinicordata*, n.sp. T
,, *spinosa*, n.sp. S
* ,, *squamosa*, n.sp. T
* ,, *stimpsoni*, M.-Edwards. T
,, *subrugosa* (White). S
* ,, *tuberculata*, n.sp. T
* ,, sp. (?). T
* *Munidopsis erinacea* (M.-Edwards). T
* ,, *sigsbei* (M.-Edwards). T
* ,, *trifida*, n.sp. S
* *Notopoides latus*, n.g., n.sp. T
* *Notopus ovalis*, n.sp. T
* *Paguristes subpilosus*, n.sp. S
* ,, *visor*, n.sp. T
Pagurodes piliferus, n.g., n.sp. T
* *Paguropsis typicus*, n.g., n.sp. T
Pagurus striatus, Latreille. T
* *Paralomis aculeatus*, n.sp. S
* *Parapagurus dimorphus* (Studer). S
* ,, *gracilis*, n.sp. T
* *Porcellana robertsoni*, n.sp. T
* *Ptychogaster lævis*, n.sp. T
* ,, *milne-edwardsi*, n.sp. S
* *Pylocheles spinosus*, n.sp. S
Uroptychus australis, n.sp. S T
* ,, *gracilimanus*, n.sp. S
* ,, *insignis* n.sp. S
* ,, *nitidus* (M.-Edwards). T
* ,, *parvulus*, n.sp. S

BRACHYURA :

* *Anamathia pulchra*, n.sp. T
* *Cyrtomaia murrayi*, n.g., n.sp. T
Ebalia lævis (Bell). S
,, *tuberculosa* (M.-Edwards). S
* *Echinoplax moseleyi*, n.g., n.sp. T
* *Ergasticus naresii*, n.sp. T
* *Ethusa orientalis*, n.sp. T
* *Eurypodius longirostris*, n.sp. S
* *Geryon* (?) *incertus*, n.sp. N
Halicarcinus planatus (Fabricius). S
Heterocrypta maltzani, Miers. N
* *Hyastenus elegans*, n.sp. T
Lambrus longimanus (Linné). T
* *Libinia smithii*, n.sp. S
* *Lispognathus thomsoni* (Norman). S
* *Litocheira kingsleyi*, n.sp. S
* *Lupocyclus* (*Parathranites*) *orientalis* n.sp. T
* *Macrocheira kämpferi*, De Haan. N
Merocryptus lambriformis, M.-Edwards. S
Mursia cristimana (M.-Edwards). S
* ,, *curtispina*, n.sp. T
* *Naxia hystrix*, n.sp. T
* *Oxypleurodon stimpsoni*, n.g., n.sp. T
* *Paracycloïs milne-edwardsii*, n.g., n.sp. T
* *Pilumnoplax abyssicola*, n.sp. T
* ,, *heterochir* (Studer). S
* *Pilumnus normani*, n.sp. T
* *Platymaia wyville-thomsoni*, n.g., n.sp. T
* *Platyonychus iridescens*, n.sp. T
* *Pugettia velutina*, n.sp. T
* *Randallia granulata*, n.sp. T

PYCNOGONIDA :

* *Ascorhynchus orthorhynchus*, n.sp. T
Colossendeis leptorhynchus, n.sp. S
,, *megalonyx*, n.sp. S
* ,, *robusta*, n.sp. S
Pallene australiensis, n.sp. S
Phoxichilidium patagonicum, n.sp. S

LAMELLIBRANCHIATA :

Amussium cancellatum, n.sp. T N
* ,, *dalli*, n.sp. N
* ,, *jeffreysii*, n.sp. T
* ,, *obliquum*, n.sp. T
* ,, *squamigerum*, n.sp. T N
* ,, *torresi*, n.sp. T
* *Anomia ephippium*, Linné. S T
* *Arca tetragona*, Poli. N
,, (*Barbatia*) *corpulenta*, n.sp. S T
,, (,,) *pteroessa*, n.sp. T N
* ,, (*Scapharca* ?) *culebrensis*, n.sp. T
,, (,,) *inæquisculpta*, n.sp. T N
* *Astarte magellanica*, Smith. S
Cardita astartoides, Martens. S
* *Carditella exulata*, n.sp. S
Cardium (*Acanthocardium*) *papillosum*, Poli. N
,, (*Papyridea*) *transversale*, Deshayes. N
Chama gryphoides, Linné. N
* *Circe bermudensis*, n.sp. N
,, *minima* (Montagu). N
* *Corbula philippii*, n.sp. N
* *Crassatella parva* (Adams). T
* *Crenella marionensis*, n.sp. S
* *Cryptodon barbatus* (Reeve). N
,, *croulinensis* (Jeffreys). N
* ,, *flexuosus* (Montagu). N
* ,, *incrassatus* (Jeffreys). T
* ,, *marionensis*, n.sp. S
* ,, *watsoni*, n.sp. T
* ,, two species undetermined. T
* *Dacrydium meridionalis*, n.sp. S
* ,, *occidentale*, n.sp. T

Davila (?) *umbonata*, n.sp. S
* *Diplodonta* sp. (?). S
Ervilia castanea (Montagu). N
,, *subcancellata*, n.sp. T N
* *Glomus inæquilateralis*, n.sp. T
* ,, *jeffreysi*, n.sp. T
* ,, *simplex*, n.sp. T
* ,, sp. (?). T
* *Idas dalli*, n.sp. T
* *Kellia nuculina*, Martens. S
* *Leda decipiens*, n.sp. T
* ,, *despecta*, n.sp. T
* ,, *hebes*, n.sp. T
* ,, *inaudax*, n.sp. T
* ,, *inopinata*, n.sp. S
,, *jeffreysi*, Hidalgo. T N
,, *messanensis*, Seguenza. N
* ,, *næriformis*, n.sp. T
* ,, *ramsayi*, n.sp. S
* ,, *rectidorsata*, Seguenza. N
* ,, *semen*, n.sp. T
* ,, *watsoni*, n.sp. T
* *Lima australis*, n.sp. S
,, *goliath*, Sowerby. S N
,, *lata*, n.sp. T
* ,, *murrayi*, n.sp. S
,, (*Limatula*) *confusa*, n.sp. T N
* ,, (,,) *laminifera*, n.sp. T
,, (,,) *pygmæa*, Philippi. S
* ,, (,,) sp. (?). S
* ,, (*Mantellum*) *loscombii*, Sowerby. S N
Limopsis aurita (Brocchi). T N
* ,, *marionensis*, n.sp. S
,, *minuta* (Philippi). T N
,, *pelagica*, n.sp. T N
* ,, *straminea*, n.sp. S
* ,, *torresi*, n.sp. T
* *Lucina cristata*, n.sp. T
* *Lucina lamellata*, Smith. S
* ,, (*Codakia*) *congenita*, n.sp. T
,, (,,) *pecten*, Lamarck. T N
* *Malletia cuneata*, n.sp. T
* ,, *veneriformis*, n.sp. T N
Modiolarca trapezina (Lamarck). S
* *Montacuta acuminata*, n.sp. T
* ,, *occidentalis*, n.sp. T
,, *pura*, n.sp. N
Mytilus exustus (Lamarck), Reeve. T
* ,, *meridionalis*, n.sp. S
* *Nœra angasi*, n.sp. S
* ,, *capensis*, n.sp. S
* ,, *claviculata*, Dall. N
* ,, *congenita*, n.sp. N
* ,, *consociata*, n.sp. T N
* ,, *curta*, Jeffreys. N
* ,, *fallax*, n.sp. T
* ,, *fragilissima*, n.sp. S
* ,, *kerguelenensis*, n.sp. S
* ,, *patagonica*, n.sp. S
* ,, two species undetermined. T
* *Nucula culebrensis*, n.sp. T
* ,, *dilecta*, n.sp. S
* ,, *niponica*, n.sp. N
* ,, *torresi*, n.sp. T
* ,, *umbonata*, n.sp. S
* *Pecten aviculoides*, n.sp. S
* ,, *challengeri*, n.sp. S
* ,, *clathratus*, Martens. S
* ,, *culebrensis*, n.sp. T
* ,, *distinctus*, n.sp. S
* ,, *gibbus* (Linné). N
,, *limatula*, Reeve. S
* ,, *philippii*, Recluz. N
,, *pusio* (Linné). N
* ,, *subhyalinus*, n.sp. S
* ,, *sulcatus*, Müller, var. *crebricostata*, Sars. N

* *Pecten testæ*, Bivona. N
,, *vitreus* (Chemnitz). S T N
* ,, two species undetermined. T
* *Poromya australis*, n.sp. T
* ,, *lævis*, n.sp. T
Saxicava arctica, Linné. S N
* *Semele obliqua* (Wood). T
* ,, (*Abra*) *braziliensis*, n.sp. T
* ,, (,,) *longicallus* (Scacchi). N
* ,, (,,) *philippinensis*, n.sp. T
* ,, (,,) *regularis*, n.sp. T
* *Solemya patagonica*, n.sp. S
* *Tellimya subacuminata*, n.sp. S
* *Tellina diluta*, n.sp. T
* ,, *murrayi*, n.sp. T
* ,, (——?) *donacina*, Linné. N
Thracia meridionalis, n.sp. S
* *Venus philomela*, n.sp. S
,, (*Ventricola*) *effossa*, Bivona. N
* *Verticordia australiensis*, n.sp. T
* ,, *deshayesiana*, Fischer. T
* ,, *ornata* (d'Orbigny). N
* ,, *woodii*, n.sp. N
* *Yoldia lischkei*, n.sp. N

Scaphopoda and Gasteropoda :

* *Aclis hyalina*, n.sp. T
* ,, *minutissima*, n.sp. T
* ,, *sarissa*, n.sp. T
* *Acmæa virginea* (Müller). N
* *Actæon exilis*, Jeffreys. N
* ,, *pusillus* (Forbes). T
* ,, *turritus*, n.sp. T
* *Adeorbis* (?), two species undetermined. T
* *Alaba* (*Diala*) *limnæiformis*, n.sp. S
* ,, (,,) sp. (?). S
* *Amphisphyra seguenzæ*, n.sp. T
* *Ancilla*(*Anaulax*)*pyramidalis* (Reeve). S
* *Basilissa alta*, n.g., n.sp. T
* *Basilissa costulata*, n.g., n.sp. T
* ,, *oxytropis*, n.g., n.sp. T
Bembix æola, n.g., n.sp. N
* *Bifrontia* (?) *pernambucensis*, n.sp. T
* *Bittium abruptum*, n.sp. N
* ,, *aëdonium*, n.sp. S
* ,, *amblyterum*, n.sp. N
* ,, *delicatum*, n.sp. S
* ,, *gemmatum*, n.sp. N
* ,, *lusciniæ*, n.sp. S
* ,, *philomelæ*, n.sp. S
* ,, *pigrum*, n.sp. S
* ,, *porcellanum*, n.sp. T
,, *reticulatum* (Costa). N
* ,, three species undetermined.
* *Borsonia ceroplasta*, n.sp. T
* ,, *silicea*, n.sp. T
* *Buccinum* (?) sp. S
* *Bulla incommoda*, n.sp. S
* ,, *pinguicula*, Jeffreys. N
,, *semilevis*, Seguenza. N
* ,, sp. (?). T
* *Cadulus ampullaceus*, n.sp. T
* ,, *curtus*, n.sp. T
* ,, ,, var. *congruens*, nov.
* ,, *exiguus*, n.sp. T
,, *gracilis*, Jeffreys. N
* ,, *obesus*, n.sp. T
* ,, *rastridens*, n.sp. T
* ,, *sauridens*, n.sp. T
* ,, *simillimus*, n.sp. T
* ,, *vulpidens*, n.sp. T
* *Cæcum lineicinctum*, n.sp. T
* ,, *regulare*, Carpenter. T
* *Cancellaria exigua*, n.sp. S
* ,, *imbricata*, n.sp. S
* ,, sp. (?). T
* *Capulus compressus*, n.sp. S
* ,, sp. (?). T

* *Cassidaria* (*Sconsia*) *striata*, Lamarck. T
* *Cassis* (*Bezoardica*) *wyrillei*, n.sp. T
* ,, three species undetermined. T
* *Cerithiopsis fayalensis*, n.sp. N
* ,, *pulchella* (Adams). T
* *Cerithium matukense*, n.sp. T
* ,, sp. (?). S
Cithna tenella (Jeffreys). T N
* *Clathurella araneosa*, n.sp. T
,, *chariessa*, n.sp. T N
* ,, *circumvoluta*, n.sp. T
* ,, *crispata* (Jan). T N
,, *formosa* (Jeffreys). T N
* ,, *hormophora*, n.sp. T
* ,, *leufroyi* (Michaud). N
* ,, *pachia*, n.sp. T
* ,, (?) *perparva*, n.sp. T
* ,, *perpauxilla*, n.sp. T
* ,, *porcellana*, n.sp. T
* ,, *pudens*, n.sp. T
* ,, *reticulata* (Renier). N
* ,, (*Daphnella*) *compsa*, n.sp. T
* ,, four species undetermined. T
* *Clionella aglaophanes*, n.sp. T
* ,, *amblia*, n.sp. T
* ,, *exsculpta*, n.sp. T
,, *lophoëssa*, n.sp., var. *platia*, nov. T
* ,, *tholoïdes*, n.sp. T
* *Columbella* (*Anachis*) *haliæeti*, Jeffreys. N
* ,, (*Pyrene*) *stricta*, n.sp. T
* ,, (,,) *strix*, n.sp. T
* ,, (,,) ,, var. *subacta*, nov.
* ,, (*Zafra*) *greci*, Philippi. N
* ,, sp. (?). T
* *Conus* sp. (?). T
Cyclostrema conicum, n.sp. T
* ,, *excavatum*, n.sp. T
* *Cyclostrema* sp. (?). T
,, sp. (?). S
* *Cylichna alba* (Brown). T N
* ,, *crispula*, n.sp. T
* ,, *cylindracea* (Pennant). S T
* ,, *discus*, n.sp. T
* ,, *ordinaria*, n.sp. S
,, *ovata*, Jeffreys. T N
* ,, (*Volvula*) *paupercula*, n.sp. T
* *Cypræa cinera*, Gmelin. T
,, *spurca* (Linné). T N
* *Dentalium ægeum*, n.sp. S
,, *capillosum*, Jeffreys. T N
,, ,, var. *paucicostatum*, nov.
,, *circumcinctum*, n.sp. T N
* ,, *compressum*, n.sp. T
* ,, *didymum*, n.sp. T
* ,, *ensiculus*, Jeffreys. T
,, *entalis*, Linné, var. *agile*, Sars. S T N
,, ,, ,, ,, *orthrum*, nov.
* *Emarginula*, two species undetermined. S
* *Eulima acerrima*, n.sp. T
* ,, *amblia*, n.sp. S
* ,, *campyla*, n.sp. T
* ,, *chaskanon*, n.sp. T
* ,, *chydæa*, n.sp. T
* ,, *chyta*, n.sp. T
* ,, *cylindrata*, n.sp. T
* ,, *ephamilla*, n.sp. T
* ,, *eurychades*, n.sp. T
* ,, *famelica*, n.sp. N
* ,, *fasciata*, n.sp. T
* ,, *gomphus*, n.sp. T
* ,, *hebes*, n.sp. T
* ,, *hians*, n.sp. T
* ,, *hyalina*, n.sp. T

* *Eulima piriformis*, Brugnone. T
* ,, *psila*, n.sp. T
* ,, *sarissa*, n.sp. T
* ,, six species undetermined. T
* ,, two ,, ,, S
* *Eulimella acerrima*, n.sp. T
* ,, *laxa*, n.sp. T
* ,, *rudis*, n.sp. T
* *Fasciolaria rutila*, n.sp. S
Fenella elongata, n.sp. T N
* *Fissurella* (*Lucapina*) *cayenensis*, Lamarck. T N
Fossarus ambiguus (Linné). T
* *Fusus niphonicus*, Smith. T
* ,, *pagodoïdes*, n.sp. S
* ,, *radialis*, n.sp. S
* ,, *sarissophorus*, n.sp. T
* ,, (*Metula*) *philippinarum*, n.sp. T
* ,, (*Neptunea*) *despectus* (Linné). N
* ,, (,,) *edwardiensis*, n.sp. S
,, (,,) *mandarinus*, Duclos. S
* ,, (,,) *scalaris*, n.sp. S
* ,, (,,) *valedictus*, n.sp. S
* ,, (*Sipho*) *futile*, n.sp. S
* ,, (,,) *libratus*, n.sp. T
* ,, (*Siphonorbis*) *amblyterus*, n.sp. N
* ,, sp. (?). T
* *Homalogyra atomus* (Philippi). S
* ,, *densicostata*, Jeffreys. T
Ianthina exigua, Lamarck (surface). T N
* *Iphitus tuberculatus*, n.sp. T
* *Jeffreysia edwardiensis*, n.sp. S
* *Lachesis* sp. (?). S
* *Lampusia* (*Priene*) *murrayi*, n.sp. S
* *Lepeta cæca* (Müller). T
Litiopa melanostoma, Rang. T N
* *Marginella brazieri*, n.sp. S
* ,, *carinata*, n.sp. S
Marginella (*Gibberula*) *miliaria* (Linné). N
* ,, (*Glabella*) *alta*, n.sp. T
* ,, (,,) *brachia*, n.sp. T
* ,, (,,) *elata*, n.sp. T
,, (,,) *musica*, Hinds. S N
* ,, (,,) *pachia*, n.sp. T
* ,, (,,) *valida*, n.sp. T
* ,, (*Granula*) *agger*, n.sp. T
* ,, three species undetermined. T
* *Mathilda* sp. (?). T
* *Mitra miranda*, n.sp. S
,, (*Cancilla*) *interlirata*, Reeve. T
Mitrularia uncinata (Reeve). T N
* *Murex* (*Chicoreus*) *calcar*, Kiener. T
* ,, (*Haustellum*) sp. (?). T
* ,, (*Ocinebra*) *aciculatus*, Lamarck. N
* ,, (*Pseudomurex*) *aëdonius*, n.sp. S
* ,, (,,) *fusulus*, Brocchi. N
* *Nassa* (*Aciculina*) *babylonica*, n.sp. T
* ,, (*Alectryon*) *psila*, n.sp. T
* *Nassaria campyla*, n.sp. S
Natica fartilis, n.sp. S
* ,, *insularum*, n.sp. T
* ,, *leptalea*, n.sp. T
* ,, *philippinensis*, n.sp. T
* ,, *psila*, n.sp. S
,, *radiata*, n.sp. N
,, *variabilis*, Recluz. N
* ,, *xantha*, n.sp. S
* ,, three species undetermined. T
* *Nerita tessellata*, Gmelin. T
* *Odostomia nitens*, Jeffreys. N
* ,, *rissoïdes*, Hanley. S
,, *turrita*, Hanley. T N
* ,, *unidentata* (Montague). T
* ,, (*Obeliscus*) *nitidula* (Adams). T N

Odostomia, (*Turbonilla*) *compressa*, Jeffreys. N
* ,, (,,) *consanguinea*, n.sp. S
* ,, (,,) *constricta*, n.sp. S
* ,, (,,) *densicostata* (Philippi). T
* ,, (,,) *fischeri*, n.sp. S
* ,, (,,) *kymatoëssa*, n.sp. T
* ,, (,,) *paucistriata*, Jeffreys. T
* ,, (,,) *philomelæ*, n.sp. S
* ,, (,,) *phrikalea*, n.sp. T
* ,, (,,) *rhabdota*, n.sp. T
* ,, (,,) sp. (?). T
* ,, three species undetermined. T
* *Oliva* (*Olivella*) *amblia*, n.sp. T
* ,, (,,) *ephamilla*, n.sp. T
* ,, (,,) *vitilia*, n.sp. T
* ,, sp. (?). T
* *Oniscia cithara*, n.sp. T
* *Phasianella* sp. (?). T
* *Phos bathyketes*, n.sp. T
* ,, *naucratoris*, n.sp. T
* ,, *smithi*, n.sp. T
* *Pleurotoma spicea*, n.sp. T
* ,, (*Bela*) *dyscrita*, n.sp. T
* ,, (,,) *phæacra*, n.sp. T
* ,, (*Drillia*) *challengeri*, n.sp. S
* ,, (,,) *crossei*, n.sp. S
* ,, (,,) *horrenda*, n.sp. T
* ,, (,,) *hoylei*, n.sp. S
* ,, (,,) *incilis*, n.sp. T
* ,, (,,) *incrassata*, Dujardin. N
* ,, (,,) *watsoni*, n.sp. S
* ,, (*Genota*) *atractoïdes*, n.sp. T
* ,, (,,) *didyma*, n.sp. T
* ,, (,,) *engonia*, n.sp. S N
Pleurotoma (*Mangelia*) *acanthodes*, n.sp. N
* ,, (,,) *corallina*, n.sp. T
* ,, (,,) *eritmeta*, n.sp. N
* ,, (,,) *hypsela*, n.sp. T
* ,, (,,) *subtilis*, n.sp. T
* ,, (,,) *tiara*, n.sp. T N
* ,, (*Perrona*) *marmarina*, n.sp. T
* ,, (*Rhaphitoma*) *rhysa*, n.sp. T
* ,, (*Spirotropis*) *stirophora*, n.sp. T
* ,, (,,) *tmeta*, n.sp. T
* ,, (*Surcula*) *anteridion*, n.sp. S
* ,, (,,) *deshayesii*, Doûmet. T
* ,, (,,) *plebeia*, n.sp. T
* ,, (,,) *staminea*, n.sp. S
* ,, (,,) *syngenes*, n.sp. T
* ,, (,,) *trilix*, n.sp. S
* ,, (*Thesbia*) *eritima*, n.sp. S
* ,, (,,) *translucida*, n.sp. S
* ,, (*Typhlomangelia*) *lincta*, n.sp. T
* ,, (,,) *lithocolleta*, n.sp. T
* ,, two species undetermined. T
,, one ,, ,, S
* *Provocator pulcher*, n.g., n.sp. S
* *Puncturella agger*, n.sp. T
* ,, *clathrata*, Jeffreys. T
* ,, *noachina* (Linné) var. *princeps*, Mighels. S
* ,, *oxia*, n.sp. T
* ,, *sportella*, n.sp. T
* ,, (*Cranopsis*) *asturiana* (Fischer). T
* ,, (,,) *granulata* (Seguenza). T

* *Puncturella* (*Cranopsis*) *profundi*, Jeffreys. T
* ,, (*Fissurisepta*) *rostrata* (Seguenza). T
* *Ranella fijiensis*, n.sp. T
,, (*Argobuccinum*) *argus* (Gmelin). S
Ringicula peracuta, n.sp. T N
* *Rissoa fayalensis*, n.sp. N
* ,, *microstoma*, n.sp. T
* ,, *pernambucensis*, n.sp. T
* ,, *pyrrhias*, n.sp. T
* ,, *xanthias*, n.sp. T
* ,, (*Alvania*) *calathus*, Forbes and Hanley. N
* ,, (,,) *cancellata* (Costa). N
,, (,,) *deliciosa*, Jeffreys. T N
* ,, (,,) *didyma*, n.sp. T
* ,, (,,) *hispidula* (Monterosato). N
* ,, (,,) *lusciniæ*, n.sp. S
* ,, (,,) *tarsodes*, n.sp. N
* ,, (*Ceratia*) *glaphyra*, n.sp. S
* ,, (,,) *macra*, n.sp. S
* ,, (,,) *pachia*, n.sp. T
* ,, (,,) *transenna*, n.sp. S
* ,, (*Cingula*) *alvearium*, n.sp. T
* ,, (,,) *rustica*, n.sp. T
* ,, (*Onoba*) *aëdonis*, n.sp. S
* ,, (,,) *arenaria* (Mighels). S
* ,, (,,) *brachia*, n.sp. T
* ,, (*Setia*) *edwardiensis*, n.sp. S
* ,, (,,) *marionensis*, n.sp. S
* ,, (,,) *philomelæ*, n.sp. S
* ,, (,,) *principis*, n.sp. S
* ,, (,,) *quisquiliarum*, n.sp. N
* ,, (,,) *tenuisculpta*, Watson. T
* ,, (,,) *triangularis*, n.sp. T
* ,, six species undetermined. T
* *Rissoina chesnelii* (Michaud). T
* *Rissoina dubiosa* (Adams). T
* ,, sp (?). T
Rotella (?) sp. N
* *Scalaria acus*, n.sp. T N
* ,, *distincta*, n.sp. S
* ,, *funiculata*, n.sp. T
* ,, *philtata*, n.sp. S
* ,, *tortilis*, n.sp. T
* ,, *vermetiformis*, n.sp. T
* ,, (*Acirsa*) *pyrrhias*, n.sp. T
Scaliola arenosa, Adams. T
,, *bella*, Adams. T
Scaphander punctostriatus (Mighels). T N
Schismope carinata, n.sp. S T
* ,, *lacuniformis*, n.sp. T
* ,, *tabulata*, n.sp. T
* ,, (?) sp. T
* *Scissurella aëdonia*, n.sp. S T
,, *alta*, n.sp. T N
* ,, *crispata*, Fleming. S T
* ,, *declinans*, n.sp. T
* ,, two species undetermined. S
Seguenzia ionica, n.sp. T N
,, *monocingulata*, Seguenza. T N
,, ,, var. *lineata*, nov.
* *Sigaretus* sp. (?). T
* *Siliquaria* (*Tenagodus*) sp. (?). T
* *Siphodentalium platamodes*, n.sp, T
* ,, *prionotum*, n.sp. T
* ,, *tytthum*, n.sp. T
* *Solarium atkinsoni*, n.sp. S
* ,, two species undetermined. T
* *Stomatella* (*Gena*) *caliginosa*, Adams. T
* *Strombus pugilis*, Linné. T
* *Terebra* (*Myurella*) *mamillata*, n.sp. T
Trachysma delicatum (Philippi). T N
* *Triforis bigemma*, n.sp. T
* ,, *hebes*, n.sp. S

* *Triforis inflata*, n.sp. T
„ *perversa* (Linné). T N
Triton (*Lagena*) *magellanicus* (Chemnitz). S
* „ „ n.sp. (?). S
* „ (*Simpulum*) *philomelæ*, n.sp. S
* *Trochus* (*Gibbula*) *glyptus*, n.sp. S
* „ (*Margarita*) *agleës*, n.sp. T
* „ („) *azorensis*, n.sp. N
* „ („) *cancellatus*, Jeffreys. T
„ („) *charopus*, n.sp. S
„ („) *clavatus*, n.sp. T
* „ („) *dnopherus*, n.sp. T
* „ („) *pompholugotus*, n.sp. T
„ („) *rhina*, n.sp. N
* „ („) *rhysus*, n.sp. T N
„ („) *scintillans*, n.sp. T N
* „ (*Omphalius*) *hotesserianus*, d'Orbigny. T
* „ (*Oxystele*) *euspira* (Dall). T
„ (*Photinula*) *expansus* (Sowerby). S
* „ (*Ziziphinus*) *stirophorus*, n.sp. T
„ („) *striatus*, Linné. N
„ („) *tiara*, n.sp. T N
* „ four species undetermined. T
* *Trophon acanthodes*, n.sp. S
* „ *aculeatus*, n.sp. T
* „ *carduelis*, n.sp. S
„ *declinans*, n.sp. S
„ *liratus*, Couthouy, MS. S
* „ *scolopax*, n.sp. S
* „ sp. (?). S
* *Turbo* (*Calvar*) *henicus*, n.sp. T
* „ (*Collonia*) *indutus*, n.sp. T
* „ (?) sp. T
* *Turritella deliciosa*, n.sp. T
* „ *exoleta* (Linné). T
* *Utriculus oryctus*, n.sp. T
* „ *spatha*, n.sp. T
* „ (*Tornatina*) *leptekes*, n.sp. T
* „ two species undetermined. T
* *Velutina*, sp. (?). T
* *Voluta* (*Cymbiola*) *lutea*, n.sp. S
„ (*Volutilithes*) *abyssicola*, Adams and Reeve. S
* *Xenophora caribæa*, Petit. T
* „ *pallidula* (Reeve). T
* „ n.sp. (?). T
* *Zeidora naufraga*, n.sp. T

POLYPLACOPHORA :

* *Lepidopleurus dallii*, n.sp. S
* „ *dorsuosus*, n.sp. S
* *Plaxiphora carmichaelis* (Gray). S
„ *simplex* (Carpenter, MS.). S

NUDIBRANCHIATA :

* *Tritonia challengeriana*, n.sp. S

CEPHALOPODA :

Calliteuthis reversa, Verrill. N
* *Nautilus pompilius*, Linné. T
* *Octopus areolatus*, De Haan, MS. T
„ *boscii* (Lesueur), var. *pallida*, nov. S
* „ *duplex*, n.sp. S
„ *januarii*, Steenstrup, MS. T N
* „ *punctatus*, Gabb. N
* *Sepia cultrata*, Steenstrup, MS. S
* „ *kiensis*, n.sp. T
* „ *sulcata*, n.sp. T
Spirula peronii, Lamarck. T

POLYZOA :

* *Adeona appendiculata*, n.sp. S
Adeonella atlantica, n.g., n.sp. S
,, *distoma*, Busk. T N
,, ,, var. *imperforata*, nov.
* ,, *regularis*, n.g., n.sp. S
Ætea anguina (Linné). S N
* *Alcyonidium flustroides*, n.sp. S
Amathia spiralis, Lamouroux. S
* ,, *tortuosa*, Wood. S
Amphiblestrum umbonatum, Busk. S
* *Ascopodaria discreta*, n.g., n.sp. S
* ,, *fruticosa* (Hincks). S
* *Aspidostoma giganteum* (Busk). S
Bicellaria navicularis, n.sp. S T
,, *pectogemma*, Goldstein. S
* *Bifaxaria corrugata*, n.g., n.sp. T
* ,, *submucronata*, n.g., n.sp. T
* *Brettia cornigera*, n.sp. T
Bugula reticulata, n.sp. S T N
* ,, *sinuosa*, n.sp. S
* ,, *versicolor*, n.sp. T
Caberea darwinii, Busk. S
* ,, *rostrata*, n.sp. S
* *Calymmophora lucida*, n.g., n.sp. S
Carbasea dissimilis, Busk. S T
,, *ovoidea*, Busk. S
,, *pedunculata*, n.sp. N
Catenicella elegans, Busk. S T
,, *hastata*, Busk. S
,, *plagiostoma*, Busk. S
* ,, *sacculata*, n.sp. T
* ,, *ventricosa*, var. *maculata*, Busk. S
* *Cellepora ansata*, n.sp. N
* ,, *armata*, Hincks, var. *erecta*, nov. S
* ,, *aspera*, n.sp. T
,, *bicornis*, n.sp. S
* *Cellepora cylindriformis*, n.sp. S
,, *eatonensis*, n.sp. S
,, *mamillata*, var. *atlantica*, Busk. S T
* ,, *ovalis*, n.sp. N
,, *pustulata*, n.sp. S
,, *tubulosa* (Hincks). S
,, *vagans*, n.sp. S T
Cribrilina monoceros (Busk). S N
,, *radiata* (Moll). S
Crisia biciliata, MacGillivray. S
,, *conferta*, Busk. S T
* ,, *cylindrica*, n.sp. S
* ,, *elongata*, M.-Edwards. T
* ,, *holdsworthii*, Busk. S
* *Diastopora patina* (Lamarck). S
* *Didymia simplex*, Busk. S
* *Dimetopia cornuta*, Busk. S
* *Electra cylindracea*, n.sp. S
Escharoides occlusa, n.sp. S T
* *Eucratea chelata* (Linné). S
* *Farciminaria atlantica*, n.sp. T
* ,, *biseriata*, n.sp. T
* ,, *brasiliensis*, n.sp. T
,, *gracilis*, n.sp. T N
,, *hexagona*, n.sp. S T
* *Fasciculipora ramosa*, d'Orbigny. S
* *Flustra denticulata*, Busk. S
Flustramorpha hastigera, n.sp. N
,, *marginata* (Krauss). S
* *Frondipora verrucosa* (Lamouroux). S
* *Gephyrophora polymorpha*, n.g., n.sp. S
Haswellia auriculata, n.g., n.sp. S
Hippothoa divaricata, Lamouroux. S N
* *Hornera frondiculata*, Lamouroux. T
Idmonea atlantica, Forbes. S N
* ,, *irregularis*, Meneghini. N
,, *marionensis*, Busk. S
,, *milneana*, d'Orbigny. S N

Kinetoskias pocillum, n.sp. S T
* *Lichenopora fimbriata*, Busk. S
,, *hispida* (Fleming). S
* ,, *holdsworthii*, Busk. S
Membranipora albida, Hincks. T N
,, *crassimarginata* (Hincks), var. *incrustans*, nov. S
,, *galeata*, Busk, var. *furcata*, nov. S N
,, *galeata*, Busk, var. *multifida*, nov.
* ,, *spinosa*, d'Orbigny. S
Menipea aculeata (d'Orbigny). S
,, *benemunita*, n.sp. S
,, *flagellifera*, n.sp. S
,, *marionensis*, n.sp. S
Micropora coriacea (Esper). S N
* ,, *uncifera*, n.sp. S
* *Microporella ciliata* (Pallas). S
,, *malusii* (Andouin). S
Mucronella castanea, n.sp. T
* ,, *rostrigera*, n.sp. S
,, *tricuspis*, Hincks. S
* ,, *ventricosa*, var. *multispinata*, Busk. S
,, (*Phylactella*?) *canalifera*, n.sp. N
Myriozoum marionense, n.sp. S
Onchopora sinclairii, Busk. S
* *Pasythea eburnea* (Smitt). T
* *Porella lævis*, var. *subcompressa*, Hincks. T
* *Porina proboscidea*, n.sp. T
Pustulopora proboscidea, M.-Edwards. S
Retepora atlantica, n.sp. N
* ,, *imperati*, Busk. T N
* ,, *margaritacea*, n.sp. T
,, *tessellata*, Hincks, var. *pubens*, nov. S
* *Salicornaria bicornis*, Busk. S
* ,, *divaricata*, n.sp. S
,, *magnifica*, n.sp. S T
* *Schizoporella auriculata*, Hassall, var. *alba*, nov. S
,, *elegans* (d'Orbigny). S
,, *marsupifera*, n.sp. S
* ,, *nivea*, n.sp. S
Scrupocellaria pilosa (Audouin). S
* *Smittia graciosa*, n.sp. S
,, *jacobensis*, n.sp. S T
,, *marionensis*, Busk. S
* ,, *orotavensis*, n.sp. N
* ,, *transversa*, n.sp. S
* *Supercytis digitata*, d'Orbigny. S
Tessaradoma boreale (Busk). T
* *Tubucellaria hirsuta* (Lamouroux). S
Turritigera stellata, n.g., n.sp. S
Vincularia gothica, d'Orbigny. S

RHABDOPLEURA :

Rhabdopleura normani, Allman (on *Lophohelia*). S

CEPHALODISCUS :

* *Cephalodiscus dodecalophus*, n.g., n.sp. S

BRACHIOPODA :

* *Crania* sp. (?). N
Discina atlantica, King. S T N
* *Kraussina pisum* (Val. *apud* Lamarck). S
* *Magasella incerta*, n.sp. T
* *Megerlia willemöesi*, n.sp. S
* *Platydia anomioides* (Scacchi). S
* *Rhynchonella nigricans* (Sowerby), var. *pixydata*, nov. S
Terebratella frielii, n.sp. T N
* *Terebratula cubensis*, Pourtalès. T
* ,, *moseleyi*, n.sp. S
,, *uva*, Broderip. S

Terebratula vitrea (Born), var. *minor*, Philippi. S T N
* *Terebratulina cailleti*, Crosse. T
,, *caput-serpentis*, Linné, var. *septentrionalis*, Couthouy. S N
* ,, *wyvillii*, n.sp. T
Waldheimia kerguelenensis, n.sp. S

TUNICATA :

* *Amaroucium colelloides*, n.sp. S
* ,, *recumbens*, n.sp. S
* *Ascidia cylindracea*, n.sp. S
,, *nigra* (Savigny). S N
* ,, *placenta*, n.sp. S
,, *tenera*, n.sp. S
* *Ascopera gigantea*, n.g., n.sp. S
* ,, *pedunculata*, n.g., n.sp. S
Colella murrayi, n.g., n.sp. S
* ,, *ramulosa*, n.g., n.sp. S
Cynthia pallida, Heller. S T
* *Cystodytes draschii*, n.sp. T
* *Didemnum savignii*, n.sp. S
* *Ecteinascidia crassa*, n.g., n.sp. T
* *Leptoclinum edwardsi*, n.sp. S
* ,, *propinquum*, n.sp. S
,, *speciosum*, n.sp., var. *asperum*, nov. S T
,, *tenue*, n.sp. S
* *Molgula pedunculata*, n.sp. S
* *Polycarpa minuta*, n.sp. S
* ,, *quadrata*, n.sp. T
,, *radicata*, n.sp. S
* *Psammaplidium subviride*, n.g., n.sp. S
Pyrosoma giganteum, Lesueur (surface.) S T
* *Styela convexa*, n.sp. S
* ,, *grandis*, n.sp. S
,, *radicosa*, n.sp. S
*———(?) *clava*, n.sp. (genus doubtful). N

FISHES :

* *Acanthaphritis grandisquamis*, n.g., n.sp. T
* *Anthias megalepis*, n.sp. T
* *Anticitharus polyspilus*, n.g., n.sp. T
* *Antigonia capros*, Lowe. T
Aphritis gobio, Günther. S
* *Bathyanthias roseus*, n.g., n.sp. T
* *Bathythrissa dorsalis*, n.g., n.sp. N
* *Beryx decadactylus*, C.V. N
* *Brachionichthys hirsutus*, Lac. S
Callionymus calauropomus, Rich. S T
* ,, *kaianus*, n.sp. T
* ,, *phasis*, n.sp. S
* *Catætyx messieri*, n.g., n.sp. S
* *Centrophorus foliaceus*, n.sp. N
* ,, *squamulosus*, n.sp. N
* *Centropristis annularis*, n.sp. T
* ,, *pleurospilus*, n.sp. T
* *Centroscyllium granulatum*, n.sp. S
* *Ceratias bispinosus*, n.sp. T
* ,, *carunculatus*, n.sp. N
Champsodon vorax, Günther. T
* *Chaunax pictus*, Lowe. T
* *Chlorophthalmus nigripinnis*, n.sp. S
* ,, *productus*, n.sp. T
* *Congromuræna guttulata*, n.sp. T
* *Cyttus abbreviatus*, Hector. S
* *Diplacanthopoma brachysoma*, n.g., n.sp. T
* *Echeneis albescens*, Schleg. T
* *Etelis* sp. (?). S
Gonostoma elongatum, n.sp. T
,, *gracile*, n.sp. N
,, *microdon*, n.sp. S T N
* *Haloporphyrus inosimæ*, n.sp. N
* *Heliastes roseus*, n.sp. T
* *Hippocampus guttulatus*, Cuv. T
Læops parviceps, n.g., n.sp. S T

* *Lepidopsetta maculata*, n.g., n.sp. S
Lepidopus tenuis, n.sp. N
Lepidotrigla spiloptera, n.sp. T
* *Lioscorpius longiceps*, n.g., n.sp. T
Lophius naresii, n.sp. T
* *Lotella marginata*, n.sp. S
* *Lycodes macrops*, n.sp. S
* *Macruronus novæ-zelandiæ* (Hector). S
Macrurus armatus, Hector. S T N
* ,, *australis* (Rich.). S
* ,, *carinatus*, n.sp. S
,, *denticulatus*, Rich. S
* ,, *fasciatus*, n.sp. S
* ,, *japonicus*, Schlegel. N
* ,, *lævis*, Lowe. T
* ,, *leptolevis*, n.sp. T
* ,, *longibarbis*, n.sp. T
* ,, *macrochir*, n.sp. N
* ,, *microlepis*, n.sp. T
,, *nasutus*, n.sp. N
,, *parallelus*, n.sp. S N
,, *villosus*, n.sp. T N
* *Malthe vespertilio*, Linné. T
* *Monacanthus occidentalis*, Günther. T
* ,, *tessellatus*, n.sp. T
* *Myripristis kaianus*, n.sp. T
Myxine australis (Jenyns). S N
* *Nematops microstoma*, n.g., n.sp. T
* *Neobythites macrops*, n.sp. T
* ,, *ocellatus*, n.sp. T
* *Nettastoma parviceps*, n. sp. N
* *Notacanthus bonapartii*, Risso. S
Notothenia longipes, Steindachner. S
* ,, *mizops*, n.sp. S
* *Ophidium murænolepis*, n.sp. T
* *Ostracion quadricornis*, Linné. T
* *Paraliparis membranaceus*, n.sp. S
Percis allporti, Günther. S
* *Peristethus liorhynchus*, Günther. T
* *Peristethus moluccense*, Bleeker. T
* ,, *murrayi*, n.sp. T
* ,, *truncatum*, n.sp. T
* *Physiculus kaupi*, Poey. N
* *Pœcilopsetta colorata*, n.g.,n.sp. T
* *Polymixia nobilis*, Lowe. N
* *Propoma roseum*, n.g., n.sp. T
Pseudophycis bacchus (Forst.). S
* *Pseudorhombus boops*, Hector. S
* ,, *hectori*, n.sp. S
* ,, *ocellatus*, n.sp. T
* *Raja nitida*, n.sp. S
* *Rhomboidichthys cornutus*, n.sp. T
* *Samaris maculatus*, n.sp. T
* *Saurus kaianus*, n.sp. T
* *Scombrops chilodipteroides*, Bleeker. N
* *Scopelus dumerilii*, Bleeker. T
Scorpæna cruenta, Solander. S
* ,, *percoides*, Solander. S T
* *Scyllium canescens*, n.sp. S
* *Sebastes hexanema*, n.sp. T
,, *macrochir*, n.sp. N
* ,, *oculatus*, C.V. S
,, *percoides*, Rich. S
* *Setarches fidjiensis*, n.sp. T
* *Solea kaiana*, n.sp. T
* *Solenognathus fasciatus*, n.sp. S
* *Spinax granulosus*, n.sp. S
* *Stomias affinis*, n.sp. T
Synaphobranchus brevidorsalis, n.sp. T N
,, *pinnatus* (Gronovius). T N
* *Trachichthys intermedius*, Hector. S
* *Triacanthodes anomalus*, Schlegel. T
* *Trichiurus lepturus*, Linné. N
* *Trigla leptacanthus*, n.sp. T
Uranoscopus kaianus, n.sp. T
* *Urolophus kaianus*, n.sp. T
* *Xenodermichthys nodulosus*, n.g., n.sp. N

Notes on the Bathymetrical Distribution.—Of the species enumerated in the above list 233 species (or 12 per cent.) were taken at more than one Station (when taken at more than two Stations the number of times is indicated within parenthesis after the name), viz.:—

Axinella erecta.
Gellius carduus.
„ *glacialis.*
Iophon chelifer.
„ *pattersoni* (3).
Myxilla mollis.
„ *nobilis.*
Petrosia similis.
Phakellia papyracea.
Reniera aquæductus.
Tedania tenuicapitata.
Trachytedania patagonica.
Azorica pfeifferæ.
Cydonium magellani.
Tetilla grandis.
Aphrocallistes bocagei (4).
Aulocystis zittelii.
Myliusia callocyathus (3).
Rossella antarctica.
Acanella rigida.
Dasygorgia geniculata.
Melitodes nodosa.
Pleurocorallium secundum (3).
Primnoella distans.
Thouarella köllikeri.
„ *variabilis.*
Balanophyllia malaccensis.
Caryophyllia clavus (4).
„ *profunda.*
„ *rugosa.*
Deltocyathus italicus.
Desmophyllum ingens (4).
Lophohelia prolifera.
Rhizotrochus fragilis.
Solenosmilia variabilis.
Halecium beanii.
Perisiphonia filicula.
Bathybiaster loripes.
Cribrella simplex (3).
Crossaster penicillatus.
Ctenodiscus procurator (5)
Gnathaster elongatus.
„ *meridionalis.*
Labidiaster annulatus.
Lophaster stellans.
Luidia aspera.
Mimaster cognatus.
Nymphaster symbolicus.
Psilaster acuminatus.
Astrotoma agassizii (5).
Gorgonocephalus pourtalesii (4).
Ophiacantha imago.
„ *rosea.*
„ *vivipara.*
Ophiactis asperula.
Ophiocamax vitrea (4).
Ophioconis antarctica.
Ophiocreas œdipus.
Ophiocten amitinum.
Ophioglypha deshayesi.
„ *irrorata.*
„ *lymani* (5).
Ophiolebes vestitus (3).
Ophiomastus tegulitius.
Ophiomusium pulchellum.
„ *validum.*
Ophiomyxa australis (5).
„ *vivipara.*
Ophiopyren longispinus.
Ophiothrix aristulata.
Arbacia dufresnii.
Asthenosoma coriaceum.
„ *gracile.*
Brissus damesi.
Cœlopleurus maillardi (3).
Dorocidaris (*Cidaris*) *papillata* (3).
Echinus magellanicus.
„ *margaritaceus* (4).
„ *norvegicus.*
Goniocidaris canaliculata.
„ *florigera.*
Hemiaster cavernosus.
Linopneustes murrayi.
Micropyga tuberculata.
Peronella decagonalis.
Phormosoma bursarium.
Salenia varispina (4).
Schizaster moseleyi (6).
Temnopleurus reynaudi (3).
Ilyodœmon maculatus.
Pseudostichopus mollis.
Psolus ephippifer.

Psolus squamatus (3).
Stichopus moseleyi.
Trochostoma antarcticum.
Aphrodita echidna.
,, *intermedia.*
Eunice magellanica.
Glycera capitata.
,, *tesselata.*
Hemipodus magellanicus.
Lagisca magellanica (4).
Neottis antarctica.
Polyeunoa lævis.
Scolecolepis cirrata.
Terebella (*Lanice*) *flabellum.*
Myzostoma willemoesii.
Bairdia amygdaloides.
,, *angulata* (3).
,, *foveolata.*
,, *victrix* (5).
,, *villosa* (3).
Bythocypris reniformis (3).
Cythere dasyderma (6).
,, *dictyon* (7).
,, *scalaris.*
,, *wyville-thomsoni* (3).
Cytherella lata (3).
,, *pulchra* (3).
,, *punctata* (3).
Krithe producta (8).
Macrocypris decora (3).
,, *similis.*
,, *tenuicauda.*
Polycope orbicularis (3).
Pseudocythere caudata.
Xestoleberis setigera.
Paralaxma carinatum.
Scalpellum elongatum.
Iphimedia pacifica.
Œliceroides rostrata.
Acanthophyra brachytelsonis.
Benthesicymus altus.
Campylonotus capensis.
,, *semistriatus* (7).
Glyphocrangon regalis.
Hemipenæus tomentosus.
Nematocarcinus undulatipes.
Nephrops thomsoni.
Pandalus maynoculus.
Penæus philippinensis.
Plesionika semilævis (3).
Sergestes atlanticus.
Stereomastis suhmi.
Elasmonotus armatus.
,, *debilis.*
Munida microphthalma.
,, *militaris* (5).
,, *tuberculata.*
Parapagurus dimorphus (4).
Uroptychus australis.
,, *nitidus.*
Ebalia tuberculosa (3).
Lispognathus thomsoni.
Lupocyclus (*Parathranites*) *orientalis.*
Oxypleurodon stimpsoni.
Pilumnoplax heterochir.
Randallia granulata.
Amussium cancellatum.
,, *squamigerum.*
Anomia ephippium.
Kellia nuculina.
Lima (*Limatula*) *laminifera.*
,, (*Mantellum*) *loscombii.*
Limopsis minuta (3).
Malletia veneriformis.
Modiolarca trapezina.
Mytilus meridionalis.
Neæra consociata.
,, *curta.*
Pecten vitreus (6).
Saxicava arctica (7).
Verticordia deshayesiana.
,, *woodii.*
Cithna tenella.
Clathurella chariessa.
,, *circumvoluta.*
,, *crispata.*
,, *hormophora* (3).
Columbella (*Anachis*) *haliæeti.*
,, (*Pyrene*) *strix* (3).
Cylichna alba.
,, *cylindracea.*
,, *ovata* (3).
Dentalium capillosum.
,, *circumcinctum* (3).
,, *entalis* (4).
Fissurella (*Lucapina*) *cayenensis.*
Natica fartilis.
Odostomia (*Obeliscus*) *nitidula.*
Pleurotoma (*Surcula*) *syngenes.*
Provocator pulcher.

Ranella fijiensis.
Ringicula peracuta.
Rissoa (Setia) tenuisculpta.
Scissurella aëdonia.
„ *crispata.*
Seguenzia monocingulata.
Trachysma delicatum.
Triforis perversa.
Trochus (Margarita) rhysus.
„ *(Ziziphinus) striatus*
Trophon acanthodes.
Adeonella distoma.
Bicellaria pectogemma.
Bugula versicolor.
Caberea darwinii (4).
Carbasea ovoidea (3).
Catenicella elegans.
Cellepora bicornis.
„ *eatonensis.*
Haswellia auriculata.
Idmonea milneana.
Membranipora galeata.
Menipea benemunita.
Mucronella ventricosa.
Pasythea eburnea (3).
Retepora imperati.
Terebratula uva.
„ *vitrea.*
Terebratulina caput-serpentis.
Waldheimia kerguelenensis.
Leptoclinum tenue.
Aphritis gobio.
Champsodon vorax (3).
Lioscorpius longiceps.
Lophius naresii.
Lotella marginata (4).
Macrurus fasciatus (3).
Neobythites macrops.
Scorpæna percoides (3).
Sebastes oculatus.
Synaphobranchus pinnatus.

The majority of these were taken at two Stations, while 32 species were taken at three Stations, 13 at four Stations, 6 at five Stations, 3 at six Stations, 3 at seven Stations, and 1 at eight Stations.

Of the 485 species taken in this zone between 100 and 500 fathoms, as well as in deeper or shallower zones (those without asterisks), 12 species (or 2 per cent.) were obtained in the zone beyond 2500 fathoms, 25 species (or 5 per cent.) in the zone between 2000 and 2500 fathoms, 51 species (or 11 per cent.) in the zone between 1500 and 2000 fathoms, 102 species (or 21 per cent.) in the zone between 1000 and 1500 fathoms and 149 species (or 31 per cent.) in the zone between 500 and 1000 fathoms; lists of these have already been given (see pages 1282, 1290, 1300–1301, 1312–13, 1325–27).

The following 290 species (or 60 per cent.) were taken in depths less than 100 fathoms, at the surface, or on the shore :—

Desmacidon ramosa.
Echinoclathria carteri.
Petrosia similis.
Stylocordyla stipitata.
Suberites carnosus.
Tedania massa.
„ *tenuicapitata.*
Anthastra communis.
Azorica pfeifferæ.
Tetilla grandis.
Polylophus philippinensis.
Rossella antarctica.
Semperella schultzei.
Eilhardia schulzei.
Leuconia fruticosa.
Leucosolenia poterium.

Corallium rubrum.
Leptogorgia purpurea.
Primnoella australasiæ.
Astræa abyssorum.
Bathyactis symmetrica.
Cladocora arbuscula.
Dendrophyllia cornigera.
Stephanophyllia formosissima.
Actinometra pulchella.
Antedon compressa.
Archaster typicus.
Bathybiaster loripes.
Chætaster longipes.
Cribrella oblusa.
„ *simplex.*
Gnathaster elongatus.
„ *meridionalis.*
Labidiaster annulatus.
Luidia aspera.
Nymphaster symbolicus.
Pentagonaster patagonicus.
Porania spiculata.
Psilaster acuminatus.
Stichaster felipes.
Amphiura squamata.
„ *studeri.*
Astromyx loveni.
Astrotoma agassizii.
Gorgonocephalus pourtalesii.
Ophiacantha imago.
„ *vivipara.*
Ophiactis asperula.
„ *mülleri.*
Ophiocamax vitrea.
Ophioglypha costata.
„ *deshayesi.*
„ *lymani.*
Ophiomyxa australis.
„ *vivipara.*
Ophionereis dubia.
Ophiothrix aristulata.
„ *berleris.*
„ *capillaris.*
Arbacia dufresnii.
Asthenosoma coriaceum.
„ *pellucidum.*
Brissopsis luzonica.
„ *lyrifera.*
Dorocidaris (*Cidaris*) *bracteata.*
„ („) *papillata.*
Echinanthus testudinarius.
Echinus magellanicus.
„ *margaritaceus.*
Fibularia australis.
Goniocidaris canaliculata.
Hemiaster cavernosus.
Micropyga tuberculata.
Peronella decagonalis.
Salenia hastigera.
Salmacis dussumieri.
Schizaster fragilis.
Spatangus raschi.
Temnopleurus hardwicki.
Cucumaria capensis.
„ *serrata.*
Holothuria atra.
Ilyodæmon maculatus.
Pseudostichopus mollis.
Psolus ephippifer.
„ *incertus.*
Synapta beselii.
Trochostoma violaceum.
Amphiporus marioni.
Ditrypa arietina.
Eunice magellanica.
„ *pycnobranchiata.*
Hyalinœcia tubicola.
Lætmonice producta.
Lagisca antarctica.
Neottis antarctica.
Polynoë platycirrus.
Serpula narconensis.
Syllis ramosa.
Terebella (*Lanice*) *flabellum.*
Argillœcia eburnea.
Bairdia amygdaloides.
„ *attenuata.*
„ *foveolata.*
„ *ovata.*
„ *victrix.*
„ *villosa.*
Bythocypris reniformis.
Cythere dictyon.
„ *foveolata.*
„ *fungoides.*
„ *impluta.*
„ *lepralioides.*
„ *rastromarginata.*
„ *scutigera.*
„ *subrufa.*

Cythere wyville-thomsoni.
Cytherella pulchra.
„ *punctata.*
Cytheridea spinulosa.
Cytheropteron angustatum.
„ *assimile.*
Macrocypris decora.
Paracypris polita.
Polycope orbicularis.
Xestoleberis curta.
„ *depressa.*
„ *setigera.*
Eusirus longipes.
Mæra rubromaculata.
Metopa crenatipalmata.
Phoxocephalus kergueleni.
Arcturus furcatus.
Astacilla marionensis.
Serolis latifrons.
„ *septemcarinata.*
Lophogaster typicus.
Ibaccus verdi.
Nauticaris marionis.
Palinosytus (*Palinostus*) *lalandii* (surface).
Penæus fissurus.
„ *philippinensis.*
„ *rectacutus.*
Sergestes atlanticus (surface).
Cryptodromia lateralis.
Eupagurus comptus.
„ *lacertosus.*
Homola orientalis.
Latreillia australiensis.
Lyreidus tridentatus.
Munida subrugosa.
Pagurodes piliferus.
Pagurus striatus.
Ebalia lævis.
„ *tuberculosa.*
Halicarcinus planatus.
Heterocrypta maltzani.
Lambrus longimanus.
Merocryptus lambriformis.
Mursia cristimana.
Colossendeis megalonyx.
Pallene australiensis.
Phoxichilidium patagonicum.
Amussium cancellatum.
Cardita astartoides.
Cardium (*Acanthocardium*) *papillosum.*
Cardium (*Papyridea*) *transversale.*
Chama gryphoides.
Circe minima.
Davila umbonata.
Ervilia castanea.
„ *subcancellata.*
Lima lata.
„ (*Limatula*) *pygmæa.*
Limopsis minuta.
Lucina (*Codakia*) *pecten.*
Modiolarca trapezina.
Mytilus exustus.
Pecten limatula.
„ *pusio.*
„ *vitreus.*
Saxicava arctica.
Thracia meridionalis.
Venus (*Ventricola*) *effossa.*
Bittium reticulatum.
Cadulus simillimus.
Cypræa spurca.
Dentalium entalis.
Fossarus ambiguus.
Fusus (*Neptunea*) *mandarinus.*
Litiopa melanostoma (surface).
Marginella (*Gibberula*) *miliaria.*
Mitra (*Cancilla*) *interlirata.*
Mitrularia uncinata.
Natica fartilis.
„ *variabilis.*
Odostomia turrita.
Pleurotoma (*Thesbia*) *translucida.*
Puncturella noachina.
Ranella (*Argobuccinum*) *argus.*
Rissoa (*Setia*) *principis.*
Rotella (?) sp.
Scaliola arenosa.
„ *bella.*
Schismope carinata.
Scissurella alta.
Triforis perversa.
Triton (*Lagena*) *magellanicus.*
Trochus (*Margarita*) *charopus.*
„ (*Photinula*) *expansus.*
„ (*Ziziphinus*) *striatus.*
Troplion declinans.
„ *liratus.*
Voluta (*Volutilithes*) *abyssicola.*
Plaxiphora simplex.
Calliteuthis reversa (surface).

Octopus loscii.
Spirula peronii.
Adeonella atlantica.
„ *distoma.*
Alcea angulina.
Amathia spiralis.
Amphiblestrum umbonatum.
Bicellaria pectogemma.
Carbasea dissimilis.
„ *ovoidea.*
Catenicella elegans.
„ *hastata.*
„ *plagiostoma.*
Cellepora bicornis.
„ *catonensis.*
„ *mamillata.*
„ *pustulata.*
„ *tubulosa.*
„ *vagans.*
Cribrilina monoceros
„ *radiata.*
Crisia conferta.
Escharoides occlusa.
Flustramorpha hastigera.
„ *marginata.*
Hoscellia auriculata.
Idmonea atlantica.
„ *marionensis.*
„ *milneana.*
Membranipora albida.
„ *crassimarginata.*
„ *galeata.*
Menipea aculeata.
„ *benemunita.*
„ *flagellifera.*
„ *marionensis.*
Micropora coriacea.
Microporella malusii.
Mucronella castanea.
„ *tricuspis.*
„ (*Phylactella*) *canalifera.*
Myriozoum marionense.
Onchopora sinclairii.
Pustulopora proboscidea.
Retepora atlantica.
„ *tessellata.*
Schizoporella marsupifera.
Scrupocellaria pilosa.
Smittia jacobensis.
„ *marionensis.*
Vincularia gothica.
Terebratulina caput-serpentis.
Waldheimia kerguelenensis.
Ascidia nigra.
Colella murrayi.
Cynthia pallida.
Leptoclinum speciosum.
Polycarpa radicata.
Pyrosoma giganteum (surface).
Styela radicosa.
Aphritis gobio.
Callionymus calauropomus.
Champsodon vorax.
Læops parviceps.
Lepidotrigla spiloptera.
Lophius naresii.
Myxine australis.
Notothenia longipes.
Percis allporti.
Pseudophycis bacchus.
Scorpæna cruenta.
Sebastes macrochir.
„ *percoides.*
Uranoscopus kaianus.

Of the 1408 species taken only in this zone between 100 and 500 fathoms, 1025 species (or 73 per cent.) are new to science, and the following 89 new genera were obtained only in this zone. (The number of species is indicated within brackets for those genera containing more than one species):—

Astrella.
Astropeplus.
Callipelta.
Calthropella.
Characella.
Dorypleres.
Epallax.
Neosiphonia.
Pleroma.
Thrombus.
Tretolophus.
Triptolemus.
Aulascus.
Amphilaphis.
Anthomuricea.
Callistephanus.
Chironephthya (3).
Clematissa (3).

Keroeides.
Muriceides.
Primnoides.
Scirpearella (4).
Stachyptilum.
Trichoptilum.
Cladopathes.
Dendrobrachia.
Taxipathes.
Scytophorus.
Pleurocyathus.
Hypopyxis.
Staurotheca.
Streptocaulus.
Stephonalia.
Calyptraster.
Leptogonaster.
Pholidaster (2).
Tarsaster.
Astroclon.
Ophiocopa.
Ophiopyren (2).
Ophiopyrgus.
Ophiosciasma.
Linopneustes.
Moiropsis.
Orphnurgus.
Allmaniella.
Eunotomastus.
Euphione.
Leaniricola.
Macduffia.
Polyeunoa.
Scalisetosus.
Megalasma.
Acanthechinus.
Caprellinoides.
Cheirimedon.
Dodecas.
Kerguelenia.
Astrurus.
Typhlapseudes.
Paralamprops.
Amphiplectus.
Campylonotus (3).
Cheiroplatea.
Chorismus.
Eudromia.
Notopoides.
Paguropsis.
Echinoplax.
Oxypleurodon.
Paracycloïs.
Platymaia.
Provocator.
Calymmophora.
Gephyrophora.
Cephalodiscus.
Ascopera (2).
Acanthaphritis.
Anticitharus.
Bathyanthias.
Bathythrissa.
Catætyx.
Diplacanthopoma.
Lepidopsetta.
Lioscorpius.
Nematops.
Pœcilopsetta.
Propoma.
Xenodermichthys.

The majority of these genera are represented by a single species, but there are three genera with two species, three genera with three species, and one genus with four species, found only in this zone.

Notes on the Geographical Distribution.—An examination of the foregoing list shows that of the 1893 species taken in this zone between 100 and 500 fathoms, 825 species (or 43 per cent.) were taken south of the southern tropic, 953 species (or 50 per cent.) were taken within the tropics, and 360 species (or 19 per cent.) were taken north of the northern tropic; while 40 species (or 2 per cent.) were found to be common to all those three areas, 33 species (or 2 per cent.) were common to the southern and northern areas, 77 species (or 4 per cent.) were common to the southern and tropical areas, and 75 species (or 4 per cent.) were common to the tropical and northern areas.

7. Animals Obtained in the Dredgings and Trawlings in Depths under 100 Fathoms.

The Challenger dredged or trawled in shallow water less than 100 fathoms at about seventy stations or localities. It is impossible to estimate the number of individual specimens procured, but they represent about 4400 species, belonging to about 1500 genera. The total number of species and genera actually described and recorded in the Zoological Reports amounts to about 4250 species, and about 1440 genera, of which 1527 species (or 36 per cent.) and 132 genera (or 9 per cent.) are new to science, as shown in the following list. Those species taken by the Challenger in this zone only (numbering 3900 species, or 92 per cent.) are indicated by an asterisk, thus *.

The geographical distribution of the species is indicated by the heavy letters S, T, and N, used to denote that the species was taken *south* of the tropic of Capricorn (S), *between* the tropics of Capricorn and Cancer (T), or *north* of the tropic of Cancer (N).

Keratosa :

* *Cacospongia amorpha*, n.sp. T
* ,, *collectrix* (Schulze). T N
* ,, *compacta*, n.sp. T
* ,, *dendroides*, n.sp. T
* ,, *irregularis*, n.sp. T
* ,, *murrayi*, n.sp. S
* ,, *oligoceras*, n.sp. T
* ,, *tuberculata*, n.sp. S
* ,, *vesiculifera*, n.sp. S
* *Carteriospongia otahitica* (Esper). T
* ,, *radiata*, Hyatt. T
* *Coscinoderma altum*, n.sp. S
* ,, *denticulatum*, n.sp. T
* *Euspongia officinalis* (Linné), var. *lobosa*, nov. T
* *Hippospongia anomala*, n.sp. T
* ,, *mauritiana* (Hyatt). T
* *Ianthella flabelliformis* (Pallas). T
* *Luffaria variabilis*, n.sp. T
* *Psammoclema foliaceum*, n.sp. S
* ,, *ramosum*, Marshall. S
* ,, *rosmaeri*, n.sp. T
* *Psammopemma densum*, Marshall. S N
* *Psammopemma porosum*, n.sp. T
* *Spongelia horrida*, Selenka. T
* ,, *pallescens*, Schmidt. T
* ,, *spinifera*, Schulze. S
* *Verongia hirsuta*, Hyatt. N

Monaxonida :

* *Acanthella pulcherrima*, n.sp. T
* ,, (?) *stipitata*, Carter. T
* *Acarnus ternatus*, Ridley. T
* *Agelas mauritianus* (Carter). S
* *Amphilectus apollinis*, n.sp. S
* ,, *ceratosus*, n.sp. S
* ,, *pilosus*, n.sp. S
* *Artemisina suberitoides*, Vosmaer. N
* *Axinella arborescens*, n.sp. S
* ,, *balfourensis*, n.sp. S
* ,, *echidnæa*, Ridley. T
* ,, *fibrosa*, n.sp. S
* ,, (?) *lunæcharta*, n.sp. T
* ,, *mariana*, n.sp. S
* ,, *monticularis*, n.sp. T
* ,, (?) *paradoxa*, n.sp. S
* ,, *reticulata*, n.sp. T

* *Chalina palmata* (Lamarck). T
* ,, *pergamentacea*, Ridley. S
* ,, *rectangularis*, n.sp. T
* ,, sp. (?). S
* ,, sp. (?). T
* *Clathria aculeata*, Ridley. T
* ,, *decumbens*, Ridley. T
* ,, *elegantula*, n.sp. S
* ,, *frondifera* (Bowerbank). T
* ,, *lendenfeldi*, n.sp. S
* *Cliona dissimilis*, n.sp. T
* *Dendropsis bidentifera*, n.g., n.sp. S
* *Desmacidon conulosa*, n.sp. S
,, (?) *ramosa*, n.sp. S
* ,, *reptans*, n.sp. T
* ,, (*Homœodictya*) *grandis*, n.sp. S
* ,, (*Homœodictya*) *kerguelenensis*, n.sp. S
Echinoclathria carteri, n.sp. S
* ,, *favus*, Carter. S
* ,, *glabra*, n.sp. S
* *Echinodictyum asperum*, n.sp. T
* ,, *rugosum*, n.sp. T
* *Esperella arenicola*, n.sp. S
* ,, *fusca*, n.sp. T
* ,, *gelatinosa* (Ridley). T
* ,, *magellanica* (Ridley). S
* ,, *murrayi*, n.sp. S
* ,, *nuda*, n.sp. T
* ,, *parishii* (Bowerbank). T
* ,, *porosa*, n.sp. S
* ,, *simonis*, n.sp. S
* ,, sp. (?). S
* *Esperiopsis anomala*, n.sp. T
* ,, *cylindrica*, n.sp. S
* ,, *edwardii* (Bowerbank), var. *americana*, nov. S
* *Gelliodes fibulata*, Ridley. T
* *Gelliodes licheniformis* (Lamarck). S
* ,, *poculum*, n.sp. S
* *Gellius flagellifer*, n.sp. S
* ,, *varius* (Bowerbank). T
* *Halichondria caduca*, Bowerbank. S
* ,, *panicea*, Johnston. S N
* ,, *solida*, n.sp. T
* ,, ,, var. *rugosa*, nov.
* ,, sp. (?). S
* ,, sp. (?). T
* *Hymeniacidon caruncula*, Bowerbank. T
* ,, (?) *hyalina*, n.sp. S
* ,, (?) *subacerata*, n.sp. T
* ,, sp. (?). S
* *Iophon abnormalis*, n.sp. S
* *Latrunculia* (?) *acerata*, n.sp. S
,, *apicalis*, n.sp. S
* ,, *bocagei*, n.sp. S
* *Myxilla mariana*, n.sp. S
* ,, ,, var. *massa*, nov.
* ,, (?) *plumosa* (Montagu), var. *fusifera*, nov. T
* ,, *rosacea* (Lieberkühn), var. *japonica*, nov. N
* *Oceanapia robusta* (Bowerbank). T
* *Pachychalina elongata*, n.sp. S
* ,, *fibrosa*, n.sp. T N
* ,, *fragilis*, n.sp. T
* ,, *lobata*, Ridley. S
* ,, *melior*, n.sp. T
* ,, (?) *pedunculata*, n.sp. S
* ,, (?) *punctata*, n.sp. S
* *Petrosia hispida*, n.sp. S
,, *similis*, n.sp., var. *compacta*, nov. S T
,, ,, ,, var. *massa*, nov.
* ,, *truncata*, n.sp. T
* ,, *variabilis* (Ridley). T
* *Phakellia flabellata*, n.sp. S

* *Plumohalichondria mammillata*, Carter. S
* *Polymastia robusta*, Bowerbank. N
* ,, sp. (?). N
* *Proteleia sollasi*, n.g., n.sp. S
* *Quasillina brevis* (Bowerbank). N
* *Raspailia flagelliformis*, n.sp. S
* ,, *tenuis*, n.sp. T
* *Reniera cinerea* (Grant). T
* *Rhaphidophlus filifer*, n.sp. T
* ,, *gracilis* (Ridley). T
* ,, *lobatus* (Vosmaer), var. *horrida*, nov. S
Rhizochalina fistulosa (Bowerbank). T N
* ,, *pedunculata*, n.sp. T
* ,, *putridosa* (Lamarck ?). S T
* *Sideroderma navicelligerum*, n.g., n.sp. T
* *Siphonochalina annulata*, n.sp. S
* ,, *intermedia*, n.sp. S
* *Spirastrella decumbens*, Ridley. T
* ,, *massa*, n.sp. S
* ,, *papillosa*, n.sp. S
* ,, *solida*, n.sp. T
Stylocordyla stipitata (Carter). S T N
,, ,, var. *globosa*, nov.
* *Suberites antarcticus*, Carter. S
,, *caminatus*, n.sp. S
,, *carnosus* (Johnston). S T N
* ,, *durissimus*, n.sp. S
* ,, *perfectus*, n.sp. S
,, *ramulosus*, n.sp., var. *cylindrifera*, nov. T
* ,, *spiralis*, n.sp. S
* *Tedania commixta*, n.sp. S
* ,, *digitata* (Schmidt). S N
* ,, ,, var. *bermudensis*, nov.
* ,, *digitata*, var. *fibrosa*, nov.
* ,, *infundibuliformis*, n.sp. S
,, *massa*, n.sp. S
Tedania tenuicapitata, Ridley. S
Tentorium semisuberites (Schmidt). S N
* *Thrinacophora cervicornis*, n.g., n.sp. T
* ,, *funiformis*, n.g., n.sp. T
* *Toxochalina robusta*, Ridley. T

TETRACTINELLIDA :

* *Amphius huxleyi*, n.g., n.sp. T
Anthastra communis, n.g., n.sp. S
* ,, *parvispicula*, n.g., n.sp. S
* ,, *pyriformis*, n.g., n.sp. S
* ,, *ridleyi*, n.g., n.sp. S
* *Azorica crassiuscula*, n.sp. (locality and depth unknown).
,, *pfeifferæ*, Carter. T N
* *Caminus sphæroconica*, n.sp. T
* *Chrotella macellata*, n.g., n.sp. T
* *Cinachyra barbata*, n.g., n.sp. S
* *Craniella carteri*, n.sp. T
* ,, *simillima* (Bowerbank). S T
* *Cydonium cosaster*, n.sp. S
* ,, *glariosus*, n.sp. T
* *Discodermia discifurca*, n.sp. S
* ,, *ornata*, n.sp. (locality and depth unknown).
* *Disyringa dissimilis* (Ridley). T
* *Erylus formosus*, n.sp. T
* *Myriastra clavosa* (Ridley). T
* ,, *simplicifurca*, n.g., n.sp. T
* ,, *subtilis*, n.g., n.sp. N
* ,, *toxodonta*, n.g., n.sp. T
* *Pilochrota anancora*, n.g., n.sp. T
* ,, *crassispicula*, n.g., n.sp. T
* ,, *gigas*, n.g., n.sp. T
* ,, *lendenfeldi*, n.g., n.sp. S
* ,, *moseleyi*, n.g., n.sp. T
* ,, *pachydermata*, n.g., n.sp. T

* *Pilochrota purpurea* (Ridley), var. *longancora*, nov. T
* ,, *tenuispicula*, n.g., n.sp. N
* *Psammastra murrayi*, n.g., n.sp. S
* *Samus anonymus*, Gray. T
* *Scolopes moseleyi*, n.g., n.sp. T
* *Stryphnus niger*, n.g., n.sp. S
* *Synops neptuni*, n.sp. T
* ,, *nitida*, n.sp. S
* *Tethya ingalli*, Bowerbank. S
* ,, *japonica*, n.sp. T
* ,, *seychellensis* (Wright). T
Tetilla grandis, n.sp. S
* ,, *merguiensis* (Carter). T
* *Thenea wyvillii*, n.sp. T
* *Theonella swinhoei*, Gray. T
* *Tribrachium schmidtii*, Weltner. T

HEXACTINELLIDA :

* *Crateromorpha meyeri*, Gray. T
* *Euplectella aspergillum*, Owen. T
* ,, (?) *nodosa*, n.sp. N
Polylophus philippinensis (Gray). T
Rossella antarctica, Carter. S
Semperella schultzei, Semper. T

CALCAREA :

* *Amphoriscus flamma*, n.sp. T
* ,, *poculum*, n.sp. S
* *Anamixilla torresi*, n.g., n.sp. T
Eilhardia schulzei, n.g., n.sp. S
* *Grantia tuberosa*, n.sp. T
* *Heteropegma nodus gordii*, n.g., n.sp. T N
* *Leucetta hæckeliana*, n.sp. S
* ,, *imperfecta*, n.sp. S
* ,, *vera*, n.sp. S
* *Leucilla connexiva*, n.sp. T
* *Leucilla uter*, n.sp. T N
* *Leuconia dura*, n.sp. T N
,, *fruticosa* (Haeckel). S
* ,, *loricata*, n.sp. S
* ,, *multiformis*, n.sp., var. *amorpha*, nov. T N
* ,, ,, ,, ,, *capillata*, nov.
* ,, ,, ,, ,, *goliath*, nov.
* ,, *ovata*, n.sp. S
* ,, *rudifera*, n.sp. N
* ,, *typica*, n.sp., var. *massa*, nov. N
* ,, ,, ,, ,, *tuba*, nov.
* *Leucosolenia challengeri*, n.sp. T
* ,, *lamarckii* (Haeckel). S
,, *poterium* (Haeckel). S
* *Pericharax carteri*, n.g., n.sp. S
* *Sycon arboreum* (Haeckel). S
* ,, *arcticum* (Haeckel), var. *maximum*, Haeckel. T N
* ,, *raphanus*, Schmidt. S T
* ,, ,, var. *tergestinum*, Haeckel.

ALCYONARIA :

* *Acamptogorgia alternans*, n.g., n.sp. T
* *Acanthoisis flabellum*, n.g., n.sp. S
* *Alcyonium antarcticum*, n.sp. S
* ,, *sollasi*, n.sp. S
* *Bebryce philippii*, n.sp. T
* *Calypterinus allmani*, n.g., n.sp. (deep-water form ?). T
* *Ceratoisis nuda*, n.sp. (deep-water form ?). T
* ,, *philippinensis*, n.sp. T
Corallium rubrum, Lamarck. T
* *Echinogorgia modesta*, n.sp. N

* *Echinogorgia pseudosassapo*, Kölliker. T
* *Echinomuricea indomalaccensis*, Ridley. T
* *Elasmogorgia filiformis*, n.g., n.sp. T
* *Ellisella maculata*, Studer. T
* *Eunicella papillosa* (Esper), Verrill. S
* *Euplexaura parciclados*, n.sp. N
* ,, *pinnata*, n.sp. N
* *Gorgonia flabellum*, Linné. N
* *Heliopora cærulea*, Blainville. T
* *Iciligorgia orientalis*, Ridley. T
* *Juncella gemmacea* (Valenciennes). T
* ,, *juncea* (Pallas), var. *alba*, nov. T
Leptogorgia purpurea (Pallas). S T
* ,, *torresia*, n.sp. T
* *Lobophytum marenzelleri*, n.sp. T
* *Lophogorgia flammea* (Ellis and Solander). S
* *Melitodes dichotoma* (Pallas). T
* ,, *esperi*, n.sp. T
* ,, *fragilis*, n.sp. T
* ,, *lævis*, n.sp. T
* ,, *philippinensis*, n.sp. T
* ,, *rubeola*, n.sp. T
* ,, *rugosa*, n.sp. S
* ,, *sinuata*, n.sp. T
* *Mopsea dichotoma* (Linné). S
* ,, *encrinula* (Lamarck). S
* *Muricea bicolor*, n.sp. T
* *Muricella crassa*, n.sp. T
* ,, *gracilis*, n.sp. T
* ,, *umbraticoides*, Studer. T
* *Paramuricea æquatorialis*, n.sp. T
* *Paranephthya capitulifera*, n.g., n.sp. T
* *Parisis australis*, n.sp. S
* *Placogorgia atlantica*, n.g., n.sp. T
* *Platycaulos danielsseni*, n.g., n.sp. T
* *Plexaura valenciennesi*, n.sp. N
* *Plexaurella philippinensis*, n.sp. T
* *Plexauroides prælonga* (Ridley). T
Primnoella australasiæ, Gray. S
* *Primnoisis ambigua*, n.g., n.sp. S
* ,, *sparsa*, n.g., n.sp. S
* *Pseudoplexaura crassa* (Ellis and Solander). N
* *Sarcophytum ambiguum*, n.sp. T
* ,, *atlanticum*, n.sp. S
* ,, *glaucum*, Quoy and Gaimard. T
* ,, *philippinensis*, n.sp. T
* ,, *tongatabuensis*, n.sp. T
* ,, *trocheliophorum*, Marenzeller, var. *amboinense*, nov. T
* *Scleronephthya pustulosa*, n.g., n.sp. T
* *Siphonogorgia köllikeri*, n.sp. T
* ,, *pallida*, n.sp. T
* ,, *pendula*, n.sp. T
* *Spongodes anguina*, n.sp. T
* ,, *bicolor*, n.sp. T
* ,, *carnea*, n.sp. T
* ,, *cervicornis*, n.sp. T
* ,, *coronata*, n.sp. T
* ,, *corymbosa*, n.sp. T
* ,, *dendrophyta*, n.sp. T
* ,, *digitata*, n.sp. T
* ,, *florida* (Esper). T
* ,, *heterocyathus*, n.sp. T
* ,, *macrospina*, n.sp. T
* ,, *monticulosa*, n.sp. T
* ,, *nephthyæformis*, n.sp. T
* ,, *pustulosa*, n.sp. T
* ,, *spicata*, n.sp. T
* ,, *spinosa*, Gray. T
* ,, *umbellata*, n.sp. T

* *Suberia genthi*, n.sp. S
* *Suberogorgia suberosa* (Pallas). N
* *Telesto* (*Carijoa*) *arborea*, n.sp. T
* ,, (,,) *rupicola*, Müller. T
* ,, (,,) *trichostemma* (Dana). T
* *Thouarella affinis*, n.sp. S
* *Tubipora musica*, Linné. T
* *Xenia elongata*, Dana. T

Pennatulida :

* *Cavernularia obesa*, Valenciennes. S
* *Clavella australasiæ*, Gray. S
* *Halisceptrum gustavianum*, Herklots, var. *parvifolia*, Kölliker. T
* *Kophobelemnon burgeri*, Herklots. T
* *Lituaria phalloides*, Pallas. N
* *Pennatula sulcata*, n.sp. T
* *Pteroeides breviradiatum*, Kölliker. N
* ,, *esperi*, Herklots. T
* *Renilla mülleri*, Schultze. S
* *Sarcophyllum grande*, Gray. S
* *Scytalium sarsi*, Herklots. T
* ,, *tentaculatum*, n.sp. T
* *Virgularia gracillima*, n.sp. S

Antipatharia :

* *Pteropathes fragilis*, n.g., n.sp. T

Actiniaria :

* *Antholoba reticulata* (Couthouy). S
* *Aulactinia* sp. (?). S
* *Calliactis polypus* (Forskål). T
* *Cerianthus americanus*, Verrill. S
* ,, *membranaceus*, Spall. T
* *Comactis flagellifera* (Drayton). S
* *Corticifera lutea*, Quoy and Gaimard. N
* ,, *tuberculosa* (Klunzinger). S
* *Dysactis crassicornis*, n.sp. S
* *Dysactis rhodora* (Couthouy). S
* *Epizoanthus cancrisocius*, Studer. N
* ,, *elongatus*, n.sp. S
* ,, *stellaris*, n.sp. T
* *Halcampa clavus* (Quoy and Gaimard). S
* ,, *kerguelensis*, n.sp. S
* *Halcampella maxima*, n.sp. T
* ,, sp. (?). T
* *Hormathia delicatula*, n.sp. (locality and depth unknown).
* *Ilyanthopsis longifilis*, n.g., n.sp. N
* *Palythoa anguicoma*, Norman. S
* ,, sp. (?). S
* *Sphenopus arenaceus*, n.sp. T
* ,, *marsupialis*, Steenstrup. T
* ,, *pedunculatus*, n.sp. T
* *Stephanidium schulzii*, n.g., n.sp. T
* *Tealia bunodiformis*, n.sp. S
* *Zoanthus confertus*, Verrill. S
* ,, *danæ*, Le Conte. N
* ,, sp. (?). N
* ,, two species undetermined. T

Corals :

Astræa abyssorum, n.sp. T
* *Balanophyllia bairdiana*, M.-Edwards and Haime. S
* ,, sp. (?). T
Bathyactis symmetrica (Pourtalès). S T N
Cladocora arbuscula, M.-Edwards and Haime. S T N
* ,, *conferta*, n.sp. T
* *Cycloseris tenuis* (Dana). T
Dendrophyllia cornigera, Blainville. T
* *Distichopora irregularis*, n.sp. T
* *Flabellum stokesi*, M.-Edwards and Haime. T

* *Flabellum transversale*, n.sp. S
* *Heterocyathus philippinensis*, Semper. T
* *Heteropsammia michelini*, M.-Edwards and Haime. T
* ,, *multilobata*, n.sp. T
* *Madracis asperula*, M.-Edwards and Haime. T N
* *Neohelia porcellana*, n.g., n.sp. T
* *Paracyathus de filippii* (Duchassaing and Michelotti). T N
* *Sphenophyllia flabellum*, n.g., n.sp. (locality and depth unknown).
o *Stephanophyllia formosissima*, n.sp. T
Stylaster gracilis, M.-Edwards and Haime. S T

Reef Corals :

* *Acanthastræa irregularis*, n.sp. T
* *Acrohelia horrescens* (Dana). T
* *Agaricia fragilis* (Dana). T N
* ,, *frondosa* (Duchassaing). T
* ,, *regularis*, n.sp. T
* *Alveopora retusa*, Verrill. T
* *Amphihelia infundibulifera* (Lamarck). T
* *Anacropora gracilis*, n.sp. T
* ,, *solida*, n.sp. T
* *Astræa ananas* (Ellis and Solander). N
* ,, *coarctata* (Duchassaing and Michelotti). N
* ,, *danæ* (M.-Edwards and Haime). T
* ,, *doreyensis* (M.-Edwards and Haime). T
* ,, *fragilis*, Dana. T
* ,, *fragum* (Esper). T
* ,, *ordinata*, Verrill. T
* ,, *pandanus*, Dana. T
* ,, *speciosa*, Dana. T
* ,, *versipora*, Dana. T
* *Astreopora profunda*, Verrill. T
* *Caulastræa distorta*, Dana. T
* *Cœloria dædalina* (Dana). T
* ,, *esperi*, M.-Edwards and Haime. T
* ,, *leptoticha*, Klunzinger. T
* ,, *stricta*, M.-Edwards and Haime. T
* *Cryptabacia talpina* (Lamarck). T
* *Cycloseris cyclolites* (Lamarck). T
* ,, *discus*, n.sp. T
* ,, *distorta* (Michelin). T
* ,, *freycineti* (M.-Edwards and Haime). T
* ,, *sinensis* (M.-Edwards and Haime). T
* ,, *tenuis* (Dana). T
* *Cylloseris incrustans*, n.g., n.sp. T
* *Cyphastræa aspera*, n.sp. T
* ,, *brueggemanni*, n.sp. T
* ,, *microphthalma* (Lamarck). T
* ,, *pleiades* (Ellis and Solander). T
* *Dendrophyllia axifuga*, M.-Edwards and Haime. T
* ,, *conferta*, n.sp. T
* ,, *diaphana*, Dana. T
* ,, *equiserialis* (M.-Edwards and Haime). T
* *Diploria cerebriformis* (Lamarck). N
* *Domoseris porosa*, n.g., n.sp. T
* ,, *regularis*, n.g., n.sp. T
* ,, *solida*, n.g., n.sp. T
* *Euphyllia glabrescens* (Chamisso and Eysenhardt). T
* ,, *rugosa*, Dana. T
* ,, *striata*, M.-Edwards and Haime. T
* ,, *turgida*, Dana. T

* *Fungia acutidens*, Studer. T
* ,, *concinna*, Verrill. T
* ,, *confertifolia*, Dana. T
* ,, *discus*, Dana. T
* ,, *horrida*, Dana. T
* ,, *patella* (Ellis and Solander). T
* ,, *paumotensis*, Stutchbury. T
* ,, *plana*, Studer. T
* ,, *repanda*, Dana. T
* ,, *rugosa*, n.sp. T
* ,, *scutaria*, Lamarck. T
* ,, *tenuidens*, n.sp. T
* ,, *valida*, Verrill. T
* *Galaxea aspera*, n.sp. T
* ,, *clavus* (Dana). T
* ,, *ellisii*, M.-Edwards and Haime. T
* ,, *explanata*, n.sp. T
* ,, *fascicularis* (Linnæus). T
* ,, *fragilis*, n.sp. T
* ,, *musicalis* (Esper). T
* ,, *tenella*, Brüggemann. T
* *Goniastræa cerium* (Dana). T
* ,, *coronalis*, n.sp. T
* ,, *eximia* (Dana). T
* ,, *favistella* (Dana). T
* ,, *grayi*, M.-Edwards and Haime. T
* ,, *laxa*, n.sp. T
* ,, *multilobata*, n.sp. T
* ,, *quoyi*, M.-Edwards and Haime. T
* *Goniopora pedunculata*, Quoy and Gaimard. T
* *Halomitra tiara*, Verrill. T
* *Herpetolitha crassa*, Dana. T
* *Hydnophora demidoffi*, Fischer. T
* ,, *microcona* (Lamarck). T
* ,, *tenella*, n.sp. T
* *Isophyllia aspera* (Duchassaing and Michelotti). T
* ,, *australis*, M.-Edwards and Haime. N
* ,, *cylindrica* (Duchassaing and Michelotti). N
* ,, *dipsacea* (Dana). N
* ,, *fragilis* (Dana). N
* ,, *knoxi* (Duchassaing and Michelotti). N
* ,, *marginata* (Duchassaing and Michelotti). N
* ,, *strigosa* (Duchassaing and Michelotti). N
* *Leptastræa ehrenbergana*, M.-Edwards and Haime. T
* ,, *roissyana*, M.-Edwards and Haime. T
* ,, *solida* (M.-Edwards and Haime). T
* ,, *transversa*, Klunzinger. T
* *Lithactinia galeriformis* (Dana). T
* ,, *pileiformis* (Dana). T
* *Madracis decactis* (Lyman). N
* *Madrepora aculeus*, Dana. T
* ,, *angulata*, n.sp. T
* ,, *appressa* (Ehrenberg). T
* ,, *aspera*, Dana. T
* ,, *austera*, Dana. T
* ,, *canalis*, n.sp. T
* ,, *capillaris*, Klunzinger. T
* ,, *cerealis*, Dana. T
* ,, *cervicornis* (Lamarck). T
* ,, *conferta*, n.sp. T
* ,, *confraga*, n.sp. T
* ,, *cuneata*, Dana. T
* ,, *cytherea*, Dana. T
* ,, *danæ*, Verrill. T

* *Madrepora diffusa*, Verrill. T
* ,, *echinata*, Dana. T
* ,, *effusa*, Dana. T
* ,, *gracilis*, Dana. T
* ,, *hebes*, Dana. T
* ,, *hyacinthus*, Dana. T
* ,, *laxa*, Lamarck. T
* ,, *manni*, n.sp. T
* ,, *millepora* (Ehrenberg). T
* ,, *minima*, n.sp. T
* ,, *mirabilis*, n.sp. T
* ,, *nasuta*, Dana. T
* ,, *nobilis*, Dana. T
* ,, *palmata* (Lamarck). T
* ,, *parilis*, n.sp. T
* ,, *paxilligera*, Dana. T
* ,, *plantaginea*, Lamarck. T
* ,, *pocillifera*, Lamarck. T
* ,, *prolifera* (Lamarck). T
* ,, *prostrata*, Dana. T
* ,, *pustulosa*, M.-Edwards and Haime. T
* ,, *ramiculosa*, Dana. T
* ,, *retusa*, Dana. T
* ,, *robusta*, Dana. T
* ,, *rosacea*, Esper. T
* ,, *rosaria*, Dana. T
* ,, *scabrosa*, n.sp. T
* ,, *secale*, Studer. T
* ,, *securis*, Dana. T
* ,, *seriata* (Ehrenberg). T
* ,, *speciosa*, n.sp. T
* ,, *surculosa*, Dana. T
* ,, *tenuis*, Dana. T
* ,, *tubigera*, Horn. T
* ,, *vastula*, n.sp. T
* ,, *virgata*, Dana. T
* *Mæandrina labyrinthica* (Ellis and Solander). N
* *Mæandrina sinuosissima*, M.-Edwards and Haime. N
* ,, *strigosa*, Dana. N
* *Manicina areolata* (Linné). S T
* *Merulina crispa*, Dana. T
* ,, *prolifera*, n.sp. T
* *Millepora alcicornis*, Linné. T N
* ,, *carthaginiensis*, Duchassaing and Michelotti. T
* ,, *confertissima*, n.sp. T
* ,, *gonagra*, M.-Edwards and Haime. T
* ,, *intricata*, M.-Edwards and Haime. T
* ,, *murrayi*, n.sp. T
* ,, *nodosa*, Esper. T
* ,, *ramosa*, Pallas. N
* *Montipora aspera*, Verrill. T
* ,, *caliculata* (Dana). T
* ,, *capitata* (Dana). T
* ,, *effusa* (Dana). T
* ,, *erosa* (Dana). T
* ,, *exesa*, Verrill. T
* ,, *exserta*, n.sp. T
* ,, *foliosa* (Pallas). T
* ,, *foveolata* (Dana). T
* ,, *fragilis*, n.sp. T
* ,, *grandiflora* (Dana). T
* ,, *irregularis*, n.sp. T
* ,, *levis*, n.sp. T
* ,, *lima* (Lamarck). T
* ,, *obtusata*, n.sp. T
* ,, *palmata* (Dana). T
* ,, *papillosa* (Lamarck). T
* ,, *patula*, Verrill. T
* ,, *rigida*, Verrill. T
* ,, *rubra* (Quoy and Gaimard). T
* ,, *scabricula* (Dana). T
* ,, *verrucosa* (Lamarck). T

* *Moseleya latistellata*, n.g., n.sp. T
* *Mussa aspera*, M.-Edwards and Haime. T
* ,, *brueggemanni*, n.sp. T
* ,, *echinata*, M.-Edwards and Haime. T
* ,, *fistulosa*, M.-Edwards and Haime. T
* ,, *multilobata*, Dana. T
* *Napopora irregularis*, n.g., n.sp. T
* *Oculina bermudensis*, Duchassaing and Michelotti. N
* ,, *coronalis*, n.sp. N
* ,, *diffusa*, Lamarck. T N
* ,, *pallens*, Ehrenberg. N
* ,, *recta*, n.sp. T
* ,, *speciosa*, M.-Edwards and Haime. N
* ,, *varicosa*, Lesueur. T N
* *Orbicella cavernosa* (Esper). T
* *Oxypora contorta*, n.sp. T
* *Pachyseris speciosa* (Dana). T
* *Pavonia crassa*, Dana. T
* ,, *decussata*, Dana. T
* ,, *divaricata*, Lamarck. T
* ,, *formosa*, Dana. T
* ,, *prætorta*, Dana. T
* *Pectinia profunda* (Dana). T
* *Phymastræa aspera*, n.sp. T
* *Physogyra aperta*, n.g., n.sp. T
* *Plesiastræa indurata*, Verrill. T
* ,, *urvillei*, M.-Edwards and Haime. T
* *Pocillopora acuta*, Lamarck. T
* ,, *brevicornis*, Lamarck. T
* ,, *cespitosa*, Dana. T
* ,, *damicornis* (Esper). T
* ,, *danæ*, Verrill. T
* ,, *grandis*, Dana. T
* ,, *ligulata*, Dana. T
* *Pocillopora nobilis*, Verrill. T
* ,, *paucistellata*, n.sp. T
* ,, *plicata*, Dana. T
* ,, *solida*, n.sp. T
* ,, *squarrosa*, Dana. T
* ,, *suffruticosa*, Verrill. T
* ,, *verrucosa* (Ellis and Solander). T
* *Podabacia robusta*, n.sp. T
* *Porites arenosa* (Esper). T
* ,, *astræoides*, Lamarck. T
* ,, *bulbosa*, n.sp. T
* ,, *clavaria*, Lamarck. N
* ,, *compressa*, Dana. T
* ,, *crassa*, n.sp. T
* ,, *crassistellata*, n.sp. T
* ,, *explanata*, n.sp. T
* ,, *gaimardi*, M.-Edwards and Haime. T
* ,, *guadaloupensis*, Duchassaing and Michelotti. T
* ,, *latistellata*, n.sp. T
* ,, *lichen*, Dana. T
* ,, *lutea*, M.-Edwards and Haime. T
* ,, *mirabilis*, n.sp. T
* ,, *palmata*, Dana. T
* ,, *parvistellata*, n.sp. T
* ,, *superficialis*, Duchassaing and Michelotti. T
* ,, *tenuis*, Verrill. T
* *Prionastræa flexuosa* (Dana). T
* ,, *obtusata*, M.-Edwards and Haime. T
* ,, *quoyi*, M.-Edwards and Haime. T
* ,, *robusta* (Dana). T
* *Psammocora excsa*, Dana. T
* ,, *obtusangula* (Lamarck). T
* ,, *ramosa*, n.sp. T

* *Rhodaræa calicularis* (Lamarck). T
* ,, *tenuidens*, n.sp. T
* *Rhodopsammia parallela*, Semper. T
* *Sandalolitha dentata*, n.g., n.sp. T
* *Seriatopora aculeata*, n.sp. T
* ,, *caliendrum*, Ehrenberg. T
* ,, *cervina* (Lamarck). T
* ,, *compressa*, Studer. T
* ,, *conferta*, n.sp. T
* ,, *contorta*, Studer. T
* ,, *crassa*, n.sp. T
* ,, *gracilis*, Dana. T
* ,, *hystrix*, Dana. T
* ,, *ocellata*, Ehrenberg. T
* ,, *stellata*, n.sp. T
* ,, *valida*, Ehrenberg. T
* *Siderastræa galaxea* (Ellis and Solander). N
* *Stephanaria stellata*, Verrill. T
* *Stylophora cellulosa*, n.sp. T
* ,, *digitata* (Pallas). T
* ,, *flabellata*, n.sp. T
* ,, *palmata* (Blainville). T
* ,, *prostrata*, Klunzinger. T
* *Symphyllia acuta*, n.sp. T
* ,, *sinuosa* (Quoy and Gaimard). T
* *Synaræa convexa*, Verrill. T
* *Tichopora tenella*, n.g., n.sp. T
* *Tichoseris obtusata*, n.g., n.sp. T
* *Trachyphyllia amarantus* (Dana). T
* *Tridacophyllia manicina*, Dana. T
* *Trochoseris stokesi*, M.-Edwards and Haime. T
* *Turbinaria æqualis*, n.sp. T
* ,, *brassica* (Dana). T
* ,, *cinerascens* (Ellis and Solander). T
* ,, *crater* (Pallas). T
* *Turbinaria patula* (Dana). T
* ,, *peltata* (Esper). T
* ,, *stellulata* (Blainville). T
* *Ulophyllia aspera*, n.sp. T
* ,, *cellulosa*, n.sp. T

Hydroida :

* *Acanthella effusa* (Busk). T
* *Acanthocladium huxleyi* (Busk). T
* *Aglaophenia attenuata*, n.sp. S
* ,, *calamus*, n.sp. T
* ,, *coarctata*, n.sp. T
* ,, *macgillivrayi* (Busk). T
* *Azygoplon rostratum*, n.g., n.sp. S
* *Calamphora parvula*, n.g., n.sp. S
* *Campanularia insignis*, n.sp. N
* ,, *ptychocyathus*, n.sp. T
* ,, *retroflexa*, n.sp. T
* *Cryptolaria pulchella*, n.sp. T
* *Desmoscyphus acanthocarpus*, n.sp. T
* ,, *gracilis*, n.sp. N
* ,, *obliquus*, n.sp. T
* ,, *pectinatus*, n.sp. S T
* *Dictyocladium dichotomum*, n.g., n.sp. S
* *Diplocheilus mirabilis*, n.g., n.sp. S
* *Diplocyathus dichotomus*, n.g., n.sp. T
* *Eudendrium vestitum*, n.sp. S
* *Grammaria insignis*, n.sp. S
* ,, *magellanica*, n.sp. S
* ,, *stentor*, n.sp. S
* *Halecium cymiforme*, n.sp. S
* ,, *dichotomum*, n.sp. S
* ,, *flexile*, n.sp. S
* ,, *telescopicum*, n.sp. S
* *Halicornaria plumosa*, n.sp. T
* *Hebella striata*, n.g., n.sp. S
* *Heteroplon pluma*, n.g., n.sp. S
* *Hypanthea aggregata*, n.sp. S
* ,, *hemispherica*, n.sp. S

* *Idia pristis*, Lamouroux. T
* *Lafoëa fruticosa*, Sars. S
* *Lictorella halecioides* (Allman). T
* *Lytocarpus longicornis* (Busk). T
* ,, *racemiferus*, n.sp. T
* ,, *secundus*, Kirchenpauer. T
* ,, *spectabilis*, n.sp. T
* *Obelia geniculata* (Linné). S
* *Plumularia armata*, n.sp. S
* ,, *dolichotheca*, n.sp. T
* ,, *flabellum*, n.sp. S
* *Schizotricha multifurcata*, n.g., n.sp. S
* ,, *unifurcata*, n.g., n.sp. S
* *Sciurella indivisa*, n.g., n.sp. T
* *Sertularia abietina*, Linné. N
* ,, *annulata*, n.sp. S
* ,, *articulata*, n.sp. S
* ,, *cylindritheca*, n.sp. T
* ,, *echinocarpa*, n.sp. S
* ,, *exserta*, n.sp. S
* ,, *gracilis*, n.sp. S
* ,, *implexa*, n.sp. S
* ,, *integritheca*, n.sp. T
* ,, *operculata*, Linné. S
* ,, *polyzonias*, Linné. S
* ,, *secunda*, n.sp. S
* *Synthecium alternans*, n.sp. S
* ,, *campylocarpum*, n.sp. S
* *Thecocladium flabellum*, n.g., n.sp. S
* *Thuiaria cupressina* (Linné). N
* ,, *pectinata*, n.sp. S
* ,, *quadridens*, n.sp. S
* ,, *vincta*, n.sp. T
* *Thyroscyphus ramosus*, Allman. T
* ,, *simplex*, n.sp. T

MEDUSÆ :

* *Pegantha pantheon*, n.g., n.sp. T
* *Polycolpa forskalii*, n.g., n.sp. T

CRINOIDEA :

* *Actinometra belli*, n.sp. T
* ,, *coppingeri*, Bell. T
* ,, *distincta*, n.sp. T
* ,, *divaricata*, n.sp. T
* ,, *duplex*, n.sp. T
* ,, *elongata*, n.sp. T
* ,, *fimbriata* (Lamarck). T
* ,, *lineata*, n.sp. T
* ,, *littoralis*, n.sp. T
* ,, *maculata*, n.sp. T
* ,, *meridionalis* (Agassiz). T
* ,, *multibrachiata*, n.sp. T
* ,, *multiradiata* (Linné). T
* ,, *nobilis*, n.sp. T
,, *parvicirra* (Müller). S T
* ,, *paucicirra*, Bell. T
* ,, *pectinata* (Retzius). T
,, *pulchella* (Pourtalès). T
* ,, *quadrata*, n.sp. T
* ,, *regalis*, n.sp. T
* ,, *rotalaria* (Lamarck). T
* ,, *sentosa*, n.sp. T
* ,, *simplex*, n.sp. T
* ,, *solaris* (Lamarck). T
* ,, *trichoptera* (Valenciennes, Müller). S
* ,, *valida*, n.sp. T
* *Antedon anceps*, n.sp. T
* ,, *antarctica*, n.sp. S
* ,, *balanoides*, n.sp. T
* ,, *carinata* (Lamarck). T
* ,, *clemens*, n.sp. T
,, *compressa*, n.sp. T
* ,, *conjungens*, n.sp. T
* ,, *denticulata*, n.sp. T
* ,, *disciformis*, n.sp. T
* ,, *dübeni*, Böhlsche. T
* ,, *elegans*, Bell. T

* *Antedon eschrichti* (Müller). N
* ,, *informis*, n.sp. T
* ,, *macronema* (Müller). S
* ,, *marginata*, n.sp. T
* ,, *microdiscus*, Bell. T
* ,, *milberti* (Müller). T
* ,, *multiradiata*, n.sp. T
* ,, *parvicirra*, n.sp. T
* ,, *quadrata*, n.sp. N
* ,, *quinduplicava*, n.sp. T
* ,, *regalis*, n.sp. T
* ,, *variipinna*, Carpenter. T
* *Metacrinus interruptus*, n.g., n.sp. T
* *Promachocrinus kerguelensis*, n.g., n.sp. S

ASTEROIDEA :

* *Acanthaster echinites* (Ellis and Solander), Lütken. T
* *Anthenea acuta*, Perrier. S
* ,, *tuberculosa*, Gray. T
Archaster typicus, Müller and Troschel. T
* *Asterias amurensis*, Lütken. N
* ,, *cunninghami*, Perrier. S
* ,, *glomerata*, n.sp. S
* ,, *meridionalis*, Perrier. S
* ,, *perrieri*, Smith. S
* ,, *torquata*, n.sp. N
* ,, *versicolor*, n.sp. N
* ,, (*Cosmasterias*) *tomidata*, n.sp. S
* ,, (*Læptasterias*) *compta*, Stimpson. N
* ,, (*Smilasterias*) *scalprifera*, n.sp. S
* ,, (*Stolasterias*) *africana* (Müller and Troschel), Perrier. S
* *Astèrias* (*Stolasterias*) *calamaria*, Gray. S
* ,, (,,) *gemmifera* (Valenciennes, MS.), Perrier. T
* ,, (,,) *glacialis*, Müller. T
* ,, (,,) *tenuispina*, Lamarck. N
* ,, (,,) *volsellata*, n.sp. T
* *Asterina cepheus* (Müller and Troschel). T
* ,, *exigua* (Lamarck), Perrier. S T
* ,, *folium* (Lütken), Agassiz. N
* ,, *gunnii*, Gray. S
* ,, *pectinifera* (Müller and Troschel). N
* ,, *penicillaris* (Lamarck). N
* ,, *regularis*, Verrill. S
* *Asterodiscus elegans*, Gray. T
* *Astropecten brasiliensis*, Müller and Troschel. T
* ,, *granulatus*, Müller and Troschel. T
* ,, *japonicus*, Müller and Troschel. N
* ,, *mesactus*, n.sp. S
* ,, *monacanthus*, n.sp. T
* ,, *pectinatus*, n.sp. S
* ,, *polyacanthus*, Müller and Troschel. S T N
* ,, *pontoporæus*, n.sp. S
* ,, *velitaris*, Martens. T
* ,, *zebra*, n.sp. T
* ,, ,, var. *rosea*, nov.
Bathybiaster loripes, n.sp., var. *obesa*, nov. S

* *Calliaster baccatus*, n.sp. S
* *Calvasterias stolidota*, n.sp. S
Chætaster longipes (Retzius), Sars. N
* *Choriaster granulatus*, Lütken. T
* *Craspidaster hesperus* (Müller and Troschel). T
Cribrella obesa, n.sp. S
,, *oculata* (Linck), Forbes. N
* ,, *ornata*, Perrier. S
,, *simplex*, n.sp. S
,, ,, var. *granulosa*, nov.
* *Crossaster papposus* (Linck), Müller and Troschel. N
Ctenodiscus australis (Lovén, MS.), Lütken. S
* *Culcita novæ-guineæ*, Müller and Troschel. T
* *Cycethra electilis*, n.sp. S
* ,, *nitida*, n.sp. S
* ,, *pinguis*, n.sp. S
* *Echinaster eridanella*, Müller and Troschel. T
* ,, *spinosus* (Retzius), Müller and Troschel. T
* ,, *spinulifer*, Smith. S
* *Fromia milleporella* (Lamarck), Gray. T
* *Ganeria falklandica*, Gray. S
Gnathaster elongatus, n.g., n.sp. S
,, *meridionalis* (Smith). S
* ,, *pilulatus*, n.g., n.sp. S
* *Gymnasteria carinifera* (Lamarck), Martens. T
* *Heliaster helianthus* (Lamarck), Dujardin and Hupé. S
* *Hippasteria plana* (Linck), Gray. N
Labidiaster annulatus, n.sp. S T
* ,, *radiosus* (Lovén, MS.), Lütken. S
* *Leiaster speciosus*, Martens. T
* *Leptoptychaster arcticus* (Sars), var. *elongata*, nov. N
* ,, *kerguelenensis*, Smith. S
* *Linckia guildingii*, Gray. T
* ,, *miliaris* (Linck), Martens. T
* ,, *pacifica*, Gray, var. *diplax* (Müller and Troschel). T
* *Luidia africana*, n.sp. S
* ,, *alternata* (Say), Lütken. T
,, *aspera*, n.sp. T
* ,, *clathrata* (Say), Lütken. T
* ,, *forficifer*, n.sp. T
* ,, *limbata*, n.sp. N
* ,, *longispina*, n.sp. T
* *Metrodira subulata*, Gray. T
* *Mithrodia clavigera* (Lamarck), Perrier. T
* *Narcissia canariensis* (d'Orbigny). T
* ,, *trigonaria*, n.sp. T
* *Nardoa tuberculata*, Gray. T
* *Nectria ocellifera* (Lamarck), Gray. S
* *Nepanthia brevis*, Perrier. T
* ,, *maculata*, Gray. T
* *Nymphaster albidus*, n.g., n.sp. T
,, *symbolicus*, n.g., n.sp. T
* *Ophidiaster cylindricus* (Lamarck), Müller and Troschel. T
* ,, *helicostichus*, n.sp. T
* ,, *tuberifer*, n.sp. T
* *Patiria bellula*, n.sp. S
* *Pedicellaster scaber*, Smith. S
* *Pentaceropsis obtusatus* (St. Vincent). T
* *Pentaceros callimorphus*, n.sp. T
* ,, *dorsatus* (Linné), Perrier. T

* *Pentaceros productus* (Bell), var. *tuberata*, nov. T
* ,, *turritus*, Linck. T
* *Pentagonaster astrologorum* (Müller and Troschel). S
* ,, *granularis* (Retzius). N
,, *patagonicus*, n.sp. S
* ,, *semilunatus*, Linck. T
* *Peribolaster folliculatus*, n.g., n.sp. S
* *Perknaster fuscus*, n.g., n.sp. S
* *Pontaster hebitus*, n.g., n.sp. N
,, *venustus*, n.g., n.sp., var. *robusta*, nov. T N
* *Porania glaber*, n.sp. S
* ,, *magellanica*, Studer. S
,, *spiculata*, n.sp. S T
* *Pseudarchaster intermedius*, n.g., n.sp. N
* ,, *tessellatus*, n.g., n.sp. S
Psilaster acuminatus, n.g., n.sp. S
* ,, *cassiope*, n.g., n.sp. T
* ,, *patagiatus*, n.g., n.sp. T
* *Pteraster affinis*, Smith. S
* ,, *militaris*, Müller and Troschel. N
* ,, *semireticulatus*, n.sp. S
* *Retaster insignis*, n.sp. T
* ,, *verrucosus*, n.sp. S
* *Rhipidaster vannipes*, n.g., n.sp. T
* *Solaster endeca* (Retzius), Forbes. N
* *Stellaster incei*, Gray. T
* ,, *princeps*, n.sp. T
* *Stichaster albulus* (Stimpson), Verrill. N
* ,, *aurantiacus* (Meyen), Verrill. S
,, *felipes*, n.sp. S
* ,, *polyplax* (Müller and Troschel). S

Ophiuroidea :
* *Amphiura antarctica* (Ljungman). S
* ,, *capensis*, Ljungman. S
* ,, *constricta*, n.sp. S
* ,, *depressa* (Ljungman). T N
* ,, *dilatata*, n.sp. S
* ,, *impressa* (Ljungman). N
* ,, *incana*, n.sp. S
* ,, *josephinæ*, Ljungman. T
* ,, *maxima*, n.sp. T
,, *squamata* (Delle Chiaje), Sars. S
,, *studeri*, Lyman. S
* ,, *tomentosa*, n.sp. S
* ,, sp. (?). T
Astronyx loveni, Müller and Troschel. N
* *Astrophyton costosum*, Seba. T
* ,, *exiguum*, Agassiz. T
Astrotoma agassizii, Lyman. S
* *Euryale aspera*, Lamarck. T
Gorgonocephalus pourtalesii, Lyman. S
* ,, *verrucosus* (Lamarck). S
Ophiacantha bidentata (Retzius), Ljungman. N
* ,, *discoidea*, n.sp. T
,, *imago*, n.sp. S
* ,, *longidens*, n.sp. T
,, *vivipara*, Ljungman. S
Ophiactis asperula (Phil.). S
* ,, *carnea*, Ljungman. S
,, *mülleri*, Lütken, var. *quinqueradia*, nov. T
* ,, *resiliens*, n.sp. S
* ,, *savignyi* (Müller and Troschel). T
* ,, sp. (?). S
* ,, sp. (?). T

* *Ophiobyrsa rudis*, n.g., n.sp. S
Ophiocamax vitrea, n.g., n.sp. T
* *Ophiochæta setosa*, Lütken. T
* *Ophiocnida pilosa*, n.sp. S T
* *Ophiocoma echinata* (Agassiz). T
* ,, *erinaceus*, Müller and Troschel. T
* ,, *pica*, Müller and Troschel. T
* ,, *pumila*, Lütken. N
* ,, *scolopendrina* (Lamarck). S T
* *Ophiocten sericeum*, Ljungman. S
* *Ophioglypha ambigua*, n.sp. S
* ,, *brevispina*, Smith. S
,, *costata*, n.sp. S
,, *deshayesi*, n.sp. S
* ,, *hexactis*, Smith. S
* ,, *intorta*, n.sp. S
* ,, *kinbergi*, Ljungman. S T
,, *lymani*, Ljungman. S
* ,, *multispina*, Ljungman. S
* ,, *sarsii* (Lütken), Lyman. N
* ,, *sinensis* Lyman. N
* *Ophiogymna elegans*, Ljungman. T
* *Ophiolepis annulosa* (Blainville). T
* ,, *cincta*, Müller and Troschel. T
* *Ophiomastix caryophyllata*, Lütken. T
* ,, *mixta*, Lütken. T
* ,, sp. (?). T
* *Ophiomaza cacaotica*, Lyman. T
* *Ophiomusium flabellum*, n.sp. S
Ophiomyxa australis, Lütken. S T
* ,, *flaccida*, Lütken. T N
,, *vivipara*, Studer. S
Ophionereis dubia (Müller and Troschel). T N
* ,, *porrecta*, Lyman. T
* ,, *reticulata* (Say). T N
* *Ophionereis schayeri* (Müller and Troschel). S T
* *Ophiopholis aculeata*, Gray. N
* *Ophiostigma africanum*, n.sp. T
* *Ophiothrix angulata*, Ayres. T N
,, *aristulata*, n.sp. S
,, *berberis*, n.sp. T
* ,, *cæspitosa*, n.sp. S
,, *capillaris*, n.sp. T
* ,, *ciliaris* (Lamarck). T
* ,, *exigua*, Lyman. T
* ,, *longipeda*, Müller and Troschel. T
* ,, *martensi*, Lyman. T
* ,, *melanosticta*, Grube. T
* ,, *nereidina* (Lamarck). T
* ,, *propinqua*, Lyman. T
* ,, *purpurea*, Martens. T
* ,, *pusilla*, Lyman. T
* ,, *stelligera*, Lyman. T
* ,, *striolata*, Grube. T
* ,, *suensonii*, Lütken. N
* ,, *triglochis*, Müller and Troschel. S
* ,, *trilineata*, Lütken. T
* ,, *virgata*, Lyman. T
* *Ophiozona impressa* (Lütken). T
* *Ophiura appressa*, Say. T
* ,, *brevispina*, Say. T
* ,, *cinerea* (Müller and Troschel). T
* ,, *tongana* (Lütken). S
* *Pectinura arenosa*, n.sp. S
* ,, *gorgonia* (Müller and Troschel). T
* ,, *maculata*, Verrill. S
* ,, *rigida*, Lyman. T
* ,, *stellata* (Ljungman). T

ECHINOIDEA :

* *Amblypneustes formosus*, Val. S
Arbacia dufresnii (Bl.). S
* ,, *nigra* (Molin). S
* ,, *pustulosa* (Leske). T
Aspidodiadema tonsum, n.g., n.sp. S T
Asthenosoma coriaceum, n.sp. T
,, *grubii*, n.sp. T
,, *pellucidum*, n.sp. T
* *Astriclypeus manni*, Verrill. N
* *Astropyga pulvinata* (Lamarck). T
* *Breynia australasiæ* (Leach). T
Brissopsis luzonica (Gray). S T N
,, *lyrifera* (Forbes). S
* *Cidaris tribuloides* (Lamarck). T
* *Clypeaster humilis* (Leske). T
* ,, *subdepressus* (Gray). T
* *Diadema setosum* (Gray). T
Dorocidaris (*Cidaris*) *bracteata*, n.sp. T
,, (,,) *papillata* (Leske). S T N
Echinanthus testudinarius, Gray. S
* *Echinocardium australe*, Gray. S N
* *Echinometra lucunter* (Leske). T
* ,, *subangularis* (Leske). T
* *Echinothrix calamaris* (Pallas). T
* ,, *turcarum* (Schynv.). T
* *Echinus angulosus* (Leske). S
,, *magellanicus*, Phil. S
,, *margaritaceus*, Lamarck. S
* *Encope emarginata* (Leske). T
* *Eupatagus valenciennesii*, Agassiz. S T
* *Evechinus chloroticus* (Val.). T
Fibularia australis, Desmoulins. S
* ,, *volva*, Agassiz. T
Goniocidaris canaliculata, Agassiz. S
* ,, *tubaria* (Lamarck). S
Hemiaster cavernosus (Phil.). S
* *Heterocentrotus mammillatus* (Klein). T
* *Hipponoë variegata* (Leske). S T
* *Holopneustes purpurescens* (Lütken). S
* *Laganum depressum*, Lesson. T
* ,, *putnami*, Barn. T
* *Lovenia elongata*, Gray. S T
* ,, *subcarinata*, Gray. T
* *Maretia planulata*, Gray. S T
* *Mellita sexforis*, Agassiz. T
* *Mespilia globulus*, Agassiz. T
* *Metalia maculosa* (Gmelin). T
* ,, *pectoralis*, Agassiz. T
* *Microcyphus zigzag*, Agassiz. S
Micropyga tuberculata, n.g., n.sp. T
* *Periaster limicola*, n.sp. T
Peronella decagonalis (Lesson). T
* ,, *peroni* (Agassiz). S
* *Phyllacanthus annulifera* (Lamarck). T
* ,, *baculosa* (Lamarck). T
* ,, *gigantea*, Agassiz. T
* ,, *verticillata* (Lamarck). T
* *Pleurechinus bothyroides*, Agassiz. T N
* *Pseudoboletia indiana* (Michelin). T
* *Rhinobrissus hemiasteroides*, n.sp. T
Salenia hastigera, n.sp. S T N
* *Salmacis bicolor*, Agassiz. T
,, *dussumieri*, Agassiz. T
* ,, *globator*, Agassiz. T
* ,, *rarispina*, Agassiz. T
* ,, *sulcata*, Agassiz. T
Schizaster fragilis (Düben and Koren). S N
* ,, *japonicus*, n.sp. T N
* *Spatangus purpureus*, Müller. N
,, *raschi*, Lovén. S
* *Sphærechinus australiæ*, Agassiz. S
* ,, *granularis* (Lamarck). T N
* *Strongylocentrotus dröbachiensis* (Müller). N

* *Strongylocentrotus eurythrogrammus* (Val.). S
* ,, *gibbosus* (Val.). S
Temnopleurus hardwicki (Gray). T N
* ,, *toreumaticus* (Klein). T
* *Toxopneustes pileolus* (Lamarck). T
* ,, *variegatus* (Lamarck). N

HOLOTHURIOIDEA :

* *Actinocucumis typica*, Ludwig. T
* *Caudina coriacea*, Hutton. S
* *Chirodota australiana*, Stimpson. S
* ,, *contorta*, Ludwig. S
* ,, *japonica*, Marenzeller. S
* ,, *purpurea*, Lesson. S
* *Colochirus australis*, Ludwig. S
* ,, *challengeri*, n.sp. T
* ,, *cucumis*, n.sp. T
* ,, *inornatus*, Marenzeller. N
* ,, *pygmæus*, n.sp. T
* ,, *quadrangularis*, Lesson. T
* ,, *spinosus* (Quoy and Gaimard). S
* ,, *violaceus*, n.sp. T
Cucumaria capensis, n.sp. S
* ,, *crocea*, Lesson. S
* ,, *discolor*, n.sp. S
* ,, *insolens*, n.sp. S
* ,, *kerguelensis*, n.sp. S
* ,, *lævigata* (Verrill). S
* ,, *mendax*, n.sp. S
* ,, *mirabilis*, n.sp. S T
* ,, *multipes*, n.sp. N
,, *serrata*, n.sp., var. *intermedia*, nov. S
,, ,, n.sp., var. *marionensis*, nov.
* *Holothuria africana*, n.sp. S
,, *atra*, Jæger. T
* *Holothuria curiosa*, Ludwig. T
* ,, *fusco-rubra*, n.sp. T
* ,, *impatiens*, Forskål. T
* ,, *martensii*, Semper. T
* ,, *minax*, n.sp. N
* ,, *monacaria*, Lesson. T
* ,, *ocellata*, Jæger. T
* ,, *spinifera*, n.sp. T
* ,, *vagabunda*, Selenka. T
Ilyodæmon maculatus, n.g., n.sp. T
* *Ocnus typicus*, n.sp. T
* *Orcula hypsipyrga*, Marenzeller. N
* *Phyllophorus* (?) *incompertus*, n.sp. S
Pseudostichopus mollis, n.g., n.sp. S
Psolus ephippifer, n.sp. S
,, *incertus*, n.sp. S
,, *operculatus*, Pourtalès. S N
* *Stichopus chloronotus*, Brandt. T
* ,, *godeffroyi*, Semper. T
* ,, *haytiensis*, Semper. N
* ,, *japonicus*, Selenka. N
* ,, ,, var. *typicus*, nov.
* ,, *möbii*, Semper. N
* ,, *sordidus*, n.sp. S
* ,, *variegatus*, Semper. T
Synapta beselii, Jæger. T
* ,, *distincta*, Marenzeller. N
* ,, *glabra*, Semper. T
* ,, *incerta*, Ludwig, var. *variabilis*, nov. N
* ,, *insolens*, n.sp. T
* ,, *lappa*, Müller. N
* ,, *picta*, n.sp. N
* ,, *verrilli*, n.sp. T
* *Thyone fusus* (Müller), var. *papuensis*, nov. T
* ,, *pervicax*, n.sp. T
* ,, *recurvata*, n.sp. S
* *Thyonidium cebuense*, Semper. T

* *Thyonidium rugosum*, n.sp. S
Trochostoma violaceum, Studer. S

ENTOZOA :

* *Ascaris biloba*, n.sp. S
* „ *simplex*, Rudolphi. S
* „ *spiculigera*, Rudolphi. S
* *Filaria flabellata*, n.sp. T
* „ *paradiseæ*, n.sp. T
* *Tænia clavulus*, n.sp. T
* „ *trichoglossi*, n.sp. T
* „ *increscens*, n.sp. S

NEMERTEA :

Amphiporus marioni, n.sp. S
* „ *moseleyi*, n.sp. S
Cerebratulus angusticeps, n.sp. S
* „ *corrugatus* (M'Intosh). S
* „ *longifissus*, n.sp. S
* „ *parkeri*, n.sp. S
* „ *truncatus*, n.sp. N
* „ two species undetermined. S
* „ sp. (?). T
* *Drepanophorus lankesteri*, n.sp. N
* „ *rubrostriatus*, Hubrecht. T
* „ *serraticollis*, Hubrecht. S
* *Eupolia delineata* (Delle Chiaje). T
* *Tetrastemma agricola*, n.sp. N

GEPHYREA :

* *Aspidosiphon speculator*, n.sp. T
* „ *truncatus*, Keferstein. T
* *Dendrostoma blandum*, Selenka and De Man. N
* *Echiurus unicinctus*, Drasche. N
* *Phascolion tubicola*, Verrill. N
* *Phascolosoma capense*, Teuscher. S
* „ *pudicum*, n.sp. S
* *Phymosoma japonicum*, Grube. S
* „ *scolops*, Selenka and De Man. T
* *Thalassema baronii*, Greeff. T

ANNELIDA :

* *Ammotrypane gracile*, n.sp. N
* *Amphitrite kerguelensis*, M'Intosh. S
* *Aphrodita australis*, Baird. S
* *Aricia platycephala*, n.sp. N
* *Artacama challengeriæ*, n.sp. S
* „ *zebuensis*, n.sp. T
* *Autolytus maclearanus*, n.sp. S
* *Brada mammillata*, Grube. S
* „ *whiteavesii*, n.sp. S
* *Chlocia flava* (Pallas). T N
* „ *fusca*, n.sp. T
* *Cirratulus assimilis*, n.sp. N
* „ *capensis*, Schmarda. S
* „ *zebuensis*, n.sp. T
* *Dasybranchus* (?) sp. N
* *Dasychone bairdi*, n.sp. N
* „ *japonica*, n.sp. N
* „ *nigro-maculata* (Baird). T
* „ *orientalis*, n.sp. T
* „ *picta*, n.sp. N
* „ *violacea* (Schmarda). S
* „ *wyvillei*, n.sp. T
Ditrypa arietina, Müller. N
* *Eone trifida*, n.sp. S
* *Eulalia capensis*, Schmarda. S
* *Eunice aphroditois*, Pallas. S T
* „ *barvicensis*, n.sp. N
* „ *bassensis*, n.sp. S
* „ *cirrobranchiata*, n.sp. N
* „ *elseyi*, Baird. T
* „ *equibranchiata*, n.sp. T
* „ *kobiensis*, n.sp. N
„ *magellanica*, n.sp. S

* *Eunice mindanavensis*, n.sp. T
* „ *murrayi*, n.sp. S
„ *ærstedi*, Stimpson. S N
„ *pycnobranchiata*, n.sp. S
* „ *torquata*, Quatrefages. T
* „ *torresiensis*, n.sp. T
* „ *vittata*, Delle Chiaje. S N
* „ sp. (?). N
* *Eunoa capensis*, n.sp. S
* „ *mindanavensis*, n.sp. T
* *Eupholoë philippinensis*, n.g., n.sp. T
* *Euphrosyne borealis*, Œrsted. N
* „ *capensis*, Kinberg. S
* *Eupompe australiensis*, n.sp. T
* *Eurythoë pacifica*, Kinberg. T N
* „ „ var. *levukaensis*, nov.
* *Eusyllis tubifex*, Gosse. N
* *Evarne kerguelensis*, n.sp. S
* *Exogone heterosetosa*, n.sp. S
* *Glycera amboinensis*, n.sp. T
* „ *lamelliformis*, n.sp. S
* „ *sagittariæ*, n.sp. T
* *Hermadion kerguelensis*, n.sp. S
* *Hermione hystrix* (Savigny). T
* *Hermodice carunculata* (Pallas). T N
* *Hesione pacifica*, n.sp. T
* „ (*Fallacia*) *pantherina*, Risso. T
* „ (?). sp. T
Hyalinœcia tubicola, Müller. S T N
„ „ var. *papuensis*, nov.
* *Hydroides multispinosa*, Marenzeller. N
Lætmonice producta, Grube. S T N
„ „ var. *assimilis*, nov.
„ „ „ *wyvillei*, nov.
Lagisca antarctica, n.sp. S
* „ (?) *hexactinellidæ*, n.sp. T
* „ *peracuta*, n.sp. T
* „ *tenuisetis*, n.sp. T
* „ *yokohamiensis*, n.sp. N
* *Laonome haeckelii*, n.sp. T
* *Leanira japonica*, n.sp. N
* „ *lævis*, n.sp. S
* *Lepidonotus cristatus*, Grube. T
* „ *gymnonotus*, Marenzeller. N
* „ *wahlbergi*, Kinberg. S
* *Loimia savignyi*, n.sp. T
* *Lumbriconereis heteropoda*, Marenzeller. N
* „ *pettigrewi*, n.sp. S
* *Marphysa goodsiri*, n.sp. T
* *Nematonereis* sp. (?). S
* „ sp. (?). T
Neottis antarctica, M'Intosh. S
* *Nephthys dibranchis*, Grube. T
* „ *trissophyllus*, Grube. S
* „ *verrilli*, n.sp. S
* *Nereis antillensis*, n.sp. T
* „ *atlantica*, n.sp. T
* „ *kerguelensis*, Baird. S
* „ *patagonica*, n.sp. S
* „ (*Ceratonereis*) *brasiliensis*, n.sp. T
* „ (*Lycoris*?) *pelagica*, Linné. N
* „ (*Perinereis*) *melanocephala*, n.sp. N
* „ (*Platynereis*) *arafurensis*, n.sp. T
* „ („) *dumerilii*, Audouin and M.-Edwards. T
* „ („) *eatoni*, M'Intosh. S T
* „ („) *kobiensis*, n.sp. N
* „ („) *tongatabuensis*, n.sp. T
* *Nicomache capensis*, n.sp. S
Nothria conchylega, Sars. N
* *Notocirrus capensis*, n.sp S

Notomastus agassizii, n.sp. T N
* *Notopygos labiatus*, n.sp. T
* „ *megalops*, n.sp. N
* *Palmyra aurifera*, Savigny. N
* *Palolo viridis*, Gray. T
* *Phyllochætopterus claparedii*, n.sp. N
* *Phyllocomus crocea*, Grube. S
* *Phyllodoce* (*Anaitis*?) *sancti-vincentis*, n.sp. T
* *Pista fasciata* (Grube). N
* *Polynoë attenuata*, n.sp. S
* „ *capensis*, n.sp. S
* „ *ocellata*, n.sp. N
„ *platycirrus*, n.sp. S
* „ *pustulata*, n.sp. N
* „ (*Langerhansia*) *euplectellæ*, n.sp. T
* „ (*Lepidonotus*) *iphionoides*, n.sp. T
* *Potamilla torelli*, Malmgren. N
* *Praxilla capensis*, n.sp. S
* *Prionospio capensis*, n.sp. S
* *Protula americana*, n.sp. N
* „ *arafurensis*, n.sp. T
* *Psammolyce fijiensis*, n.sp. T
* *Ranzania* (?) *capensis*, n.sp. S
* *Sabella bipunctata*, Baird. T
* „ *fusca*, Grube. S
* „ *zebuensis*, n.sp. T
* *Sabellaria* (*Pallasia*) *capensis* (Schmarda). S
* „ („) *giardi*, n.sp. S
* „ („) *johnstoni*, n.sp. T
* *Salvatoria kerguelensis*, n.g., n.sp. S
Scalibregma inflatum, Rathke. S
* *Schmardanella pterochæta* (Schmarda). S
Serpula narconensis, Baird. S
* *Staurocephalus australiensis*, n.sp. S
* *Syllis capensis*, n.sp. S
* *Syllis gigantea*, n.sp. S
„ *ramosa*, n.sp. T
* *Terebella crassicornis*, Schmarda. N
„ (*Lanice*) *flabellum*, Baird. S
* „ („) *seticornis*, n.sp. S
* *Thalenessa digitata*, n.sp. T
* „ *fimbriata*, n.sp. S
* „ *oculata*, n.sp. S T
* *Thelepus cincinnatus* (Fabricius), var. *canadensis*, nov. N
* „ sp. (?). T
* *Travisia kerguelensis*, n.sp. S
* *Trophonia capensis*, n.sp. S

MYZOSTOMIDA :

* *Myzostoma dentatum*, n.sp. T
* „ *filiferum*, n.sp. T
* „ *fimbriatum*, n.sp. N
* „ *gigas*, Lütken. T N
* „ *horologium*, n.sp. T
* „ *intermedium*, n.sp. T
* „ *longicirrum*, n.sp. T
* „ *membranaceum*, n.sp. T
* „ *platypus*, n.sp. T
* „ *quadricaudatum*, n.sp. T
* „ *quadrifilum*, n.sp. T

OSTRACODA :

* *Aglaia clavata*, n.sp. S
* „ (?) *meridionalis*, n.sp. S
* „ (?) *obtusata*, n.sp. S
* „ (?) *pusilla*, n.sp. S
* *Argillæcia badia*, n.sp. S
„ *eburnea*, n.sp. S
Bairdia amygdaloides, Brady. S T
„ *attenuata*, n.sp. T
* „ *crosskeiana*, Brady. T
* „ *expansa*, n.sp. T
* „ *fortificata*, n.sp. T

Bairdia foveolata, Brady. S T N
* ,, *fusca*, Brady. S
* ,, *globulus*, n.sp. T
,, *minima*, n.sp. S N
,, *ovata*, Bosquet. S
* ,, *simplex*, n.sp. S
* ,, *tuberculata*, Brady. T
,, *victrix*, Brady. S T N
,, *villosa*, n.sp. S
* ,, *woodwardiana*, n.sp. T
* *Bythocypris* (?) *compressa*, n.g., n.sp. T
,, *reniformis*, n.g., n.sp. S T
* *Bythocythere* (?) *exigua*, n.sp. S
* ,, *pumilio*, n.sp. S
* *Cythere acupunctata*, n.sp. N
,, *adunca*, Brady. T
* ,, *audei*, Brady. S T
* ,, *bicarinata*, n.sp. N
* ,, *canaliculata* (Reuss). S
* ,, *cancellata*, Brady. T
* ,, *clavigera*, n.sp. S
* ,, *convoluta*, Brady. T
* ,, *craticula*, n.sp. S
* ,, *cribriformis*, Brady. T
* ,, *crispata*, Brady. S T
* ,, *cristatella*, n.sp. T
* ,, *cumulus*, n.sp. S
* ,, *curvicostata*, n.sp. T
* ,, *cymba*, Brady. T N
* ,, *darwini*, Brady. T N
* ,, *demissa*, Brady. S
,, *dictyon*, n.sp. S T N
* ,, *euplectella*, Brady. T
* ,, *exilis*, n.sp. S
* ,, *falklandi*, n.sp. S
* ,, *flabellicosta*, n.sp. S
* ,, *flos cardui*, n.sp. T
,, *foveolata*, n.sp. S
* ,, *fulvotincta*, n.sp. S

Cythere fungoides (Brady). T N
* ,, *goujoni*, Brady. S T
* ,, *hodgii*, Brady. N
,, *impluta*, n.sp. S
* ,, *irrorata*, n.sp. T
* ,, *kerguelenensis*, n.sp. S
* ,, *lauta*, n.sp. T
,, *lepralioides*, n.sp. S
* ,, *lubbockiana*, n.sp. T
* ,, *melobesioides*, Brady. T
* ,, *moseleyi*, n.sp. S
* ,, *murrayana*, n.sp. S
* ,, *obtusalata*, n.sp. S T
* ,, *ovalis*, n.sp. T
* ,, *packardi*, n.sp. T
* ,, *papuensis*, n.sp. T
* ,, *prava* (Baird). T
* ,, *quadriaculeata*, n.sp. T N
,, *rastromarginata*, n.sp. S T
* ,, *reussi*, Brady. S T
* ,, *sabulosa*, n.sp. T
* ,, *scabrocuneata*, n.sp. S N
* ,, *scintillulata*, n.sp. S
,, *scutigera*, Brady. S T
* ,, *stimpsoni*, Brady. N
,, *stolonifera*, n.sp. S
,, *subrufa*, n.sp. S
* ,, *tenera*, Brady. N
* ,, *tetrica*, n.sp. T
* ,, *tricristata*, n.sp. S T
* ,, *velivola*, n.sp. T
* ,, *vellicata*, n.sp. S
,, *wyville-thomsoni*, n.sp. S T
* *Cytherella cavernosa*, Brady. S T
* ,, *cribrosa*, n.sp. T
* ,, *dromedaria*, n.sp. S
* ,, *polita*, Brady. S
,, *pulchra*, Brady. S T N
,, *punctata*, Brady. S T

* *Cytherella semitalis*, Brady. T
* ,, *venusta*, n.sp. T
Cytheridea spinulosa, Brady. T
* *Cytherideis lævata*, n.sp. S
Cytheropteron (?) *angustatum*, n.sp. S T
,, *assimile*, n.sp. S
* ,, *intermedium*, Brady. N
* ,, *scaphoides*, n.sp. S
* ,, *wellingtoniense*, n.sp. S
* *Cytherura clausi*, n.sp. S
* ,, *clavata*, n.sp. S
* ,, *costellata*, n.sp. S
* ,, *cryptifera*, n.sp. S
* ,, *curvistriata*, n.sp. S
* ,, *lilljeborgi*, n.sp. S
* ,, *mucronata*, n.sp. S
* ,, *obliqua*, n.sp. S
* ,, *rudis*, Brady. S
* *Krithe hyalina*, n.sp. N
* *Loxoconcha alata*, Brady. T
* ,, *anomala*, n.sp. T
* ,, *australis*, n.sp. S T
* ,, *avellana*, Brady. S T
* ,, *guttata* (Gorman). N
* ,, *honoluliensis*, n.sp. T
* ,, *pumicosa*, n.sp. T
* ,, *sculpta*, Brady. T
* ,, *sinensis*, Brady. T N
* ,, *subrhomboidea*, n.sp. S
* ,, *variolata*, Brady. T
Macrocypris decora, Brady. S T
* ,, *maculata*, Brady. S T
* ,, *orientalis*, Brady. T
* ,, *setigera*, n.sp. S
* ,, *tumida*, n.sp. S
Paracypris polita, Sars. S T N
* *Paradoxostoma abbreviatum*, Sars. S
* ,, *ensiforme*, Brady. N
* *Philomedes wyville-thomsoni*, n.sp. S
* *Phlyctenophora zealandica*, n.g., n.sp. S T
* *Polycope cingulata*, n.sp. (locality and depth unknown).
,, *orbicularis*, Sars. S T N
* *Pontocypris attenuata*, Brady. T
* ,, *faba* (Reuss). S T
* ,, *simplex*, n.sp. T
* ,, (?) *subreniformis*, n.sp. S
* *Sclerochilus contortus* (Norman). S
* *Sestoleberis africana*, n.sp. S
,, *curta*, Brady. S T N
,, *depressa*, Sars. S
* ,, *foveolata*, n.sp. T
* ,, *granulosa*, n.sp. S
* ,, *margaritea*, Brady. T
* ,, *nana*, n.sp. T
* ,, *polita*, Brady. S
,, *setigera*, n.sp. S
* ,, *tumefacta*, n.sp. T
,, *variegata*, n.sp. T

COPEPODA :

* *Alebion charchariæ*, Krøyer. T
* *Echthrogaleus affinis*, M.-Edwards. (locality unknown).
* *Lepeophtheirus suhmi*, n.sp. T
* *Lernæa hemiramphi*, Krøyer. T
* *Nogagus grandis*, Steenstrup and Lütken (locality unknown).
* *Pandarus zygænæ*, n.sp. T
* *Perissopus dentatus* (Steenstrup and Lütken) (locality unknown).

CIRRIPEDIA :

* *Acasta fenestrata*, Darwin. T
* *Balanus amaryllis*, Darwin. T N
* ,, *lævis*, Bruguière. S

* *Balanus rostratus*, n.sp. N
* ,, *socialis*, n.sp. T
* ,, *tintinnabulum* (Linné), var. *communis*, Darwin. T
* ,, *tintinnabulum* (Linné), var. *spinosus*, Gmelin.
* ,, *trigonus*, Darwin. S N
* ,, sp. (?) T
* *Chthamalus dentatus*, Krauss. T
* *Conchoderma virgatum* (Spengler). T
* *Coronula diadema* (Linné). N
* *Lepas anatifera*, Linné. N
,, *hillii* (Leach). T
* *Scalpellum stroemii*, Sars. N
* ,, *trispinosum*, n.sp. T
* *Sylon challengeri*, n.sp. N
* *Tetraclita cærulescens* (Spengler). T
* ,, *rosea* (Krauss). S

Amphipoda :

* *Acontiostoma kergueleni*, n.g., n.sp. S
* ,, *magellanicum*, n.g., n.sp. S
* ,, *marionis*, n.g., n.sp. S
* ,, *pepinii*, n.g., n.sp. S
* *Amaryllis bathycephalus*, n.sp. S
* ,, *macrophthalmus*, Haswell. S
* *Ambasia integricauda*, n.sp. S
* *Ampelisca acinaces*, n.sp. S
* *Amphithoë flindersi*, n.sp. T
* ,, *japonica*, n.sp. N
* ,, *kergueleni*, n.sp. S
* *Anonyx cicadoides*, n.sp. S
* *Aora kergueleni*, n.sp. S
* ,, *trichobostrichus*, n.sp. S
* *Atyloides australis* (Miers). S
* ,, *serraticauda*, n.g., n.sp. S
* *Atylopsis dentatus*, n.g., n.sp. S
* ,, *magellanicus*, n.g., n.sp. S
* *Atylus homochir*, Haswell. S
* *Autonoe philacantha*, n.sp. S
* *Caprella danilevskii*, Czerniavski. N
* ,, *scaura*, Templeton. N
* *Cardenio paurodactylus*, n.g., n.sp. S
* *Cerapus flindersi*, n.sp. T
* *Chosroës incisus*, n.g., n.sp. S
* *Dexamine flindersi*, n.sp. T
* *Dryopoides westwoodi*, n.g., n.sp. S
Elasmopus subcarinata (Haswell). S
* *Epimera loricata*, Sars. N
* *Eusiroides cæsaris*, n.g., n.sp. S
* ,, *pompeii*, n.g., n.sp. S
Eusirus longipes, Boeck. S
* *Euthemisto thomsoni*, n.n. S
* *Gammaropsis exsertipes*, n.sp. S
* *Halimedon schneideri*, n.sp. S
* *Halirages fulvocinctus* (Sars). N
* ,, *huxleyanus* (Spence Bate). S
* *Haplocheira plumosa*, n.sp. S
* *Harpinia obtusifrons*, n.sp. S
* *Harpinioides drepanocheir*, n.g., n.sp. S
* *Hippomedon geelongi*, n.sp. S
* ,, *kergueleni* (Miers). S
* ,, *miersi*, n.sp. S
* ,, *trigonicus*, n.sp. S
* *Hyperia gaudichaudii*, M.-Edwards. S
* *Icilius danæ*, n.sp. S
* *Iphimedia pulchridentata*, n.sp. S
* *Leucothoë flindersi*, n.sp. T
* *Liljeborgia æquabilis*, n.sp. S
* ,, *consanguinea*, n.sp. S
* ,, *haswelli*, Stebbing. S
* *Lysianax variegatus* (Stimpson). S
Mæra rubromaculata (Stimpson). S
* *Metopa compacta*, n.sp. S
,, *crenatipalmata*, n.sp. S
* ,, *magellanica*, n.sp. S
* ,, *ovata*, n.sp. S
* ,, *parallelocheir*, n.sp. S

* *Œdiceroides ornata*, n.g., n.sp. S
* *Œdiceros linceus*, Sars. N
* *Orchestia selkirki*, n.sp. S
* *Orchomene carimanus*, n.sp. S
* *Pardalisca abyssi*, Boeck. N
* *Parelasmopus suluensis* (Dana). T
* *Photis brevicaudata*, n.sp. S
* ,, *macrocarpus*, n.sp. S
Phoxocephalus kergueleni, n.sp. S
* *Phtisica* (*Proto*) *noræ-hollandiæ*, Haswell. S
* *Platophium inconspicuum*, n.sp. S
* *Platyischnopus mirabilis*, n.g., n.sp. S
* *Pleustes panopla* (Krøyer). N
* *Podocerus falcatus* (Montagu). S
* *Protella gracilis*, Dana. T
* *Protellopsis kergueleni*, n.g., n.sp. S
* *Rhachotropis aculeatus* (Lepechin). N
* ,, *kergueleni*, n.sp. S
* *Seba saundersii*, Stebbing. S
* *Socarnoides kergueleni*, n.g., n.sp. S
* *Sophrosyne murrayi*, n.g., n.sp. S
* *Stegocephalus inflatus*, Krøyer. N
* *Syrrhoë semiserrata*, n.sp. S
* *Tritata kergueleni*, n.sp. S
* *Tryphosa barbatipes*, n.sp. S
* *Unciola irrorata*, Say. N
* *Vibilia viator*, n.sp. T

Isopoda :

* *Anceus latidens*, n.sp. T
* ,, *tuberculosus*, n.sp. S
* *Apseudes spectabilis*, Studer. S
* *Arcturus americanus*, n.sp. S
,, *furcatus*, Studer. S
* ,, *oculatus*, n.sp. S
* ,, *stebbingi*, n.sp. S
* ,, *studeri*, n.sp. S
* ,, sp. (?). S
Astacilla marionensis, n.sp. S
Bathytanais bathybrotes, n.g., n.sp. S N
* *Ceratocephalus grayanus*, White, MS. S
* *Jæra pubescens*, Dana. S
* *Munna maculata*, n.sp. S
* ,, *pallida*, n.sp. S
* *Serolis australiensis*, n.sp. S
* ,, *convexa*, Cunningham. S
* ,, *cornuta*, Studer. S
* ,, *elongata*, n.sp. S
,, *latifrons*, White. S
* ,, *longicaudata*, n.sp. S
* ,, *minuta*, n.sp. S
* ,, *pallida*, n.sp. S
* ,, *paradoxa* (Fabricius). S
* ,, *schythei*, Lütken. S
,, *septemcarinata*, Miers. S
* ,, *tuberculata*, Grube. S
* *Tanais willemoesii*, Studer. S
* Thirty-two species of Isopods undetermined. S

Phyllocarida :

* *Paranebalia longipes*, n.g., n.sp. N

Cumacea :

* *Cyclaspis australis*, n.sp. S
* ,, *exsculpta*, n.sp. T
* ,, *pusilla*, n.sp. T

Stomatopoda :

* *Gonodactylus chiragra*, Latreille. T N
* ,, ,, var. *minutus*, nov.
* ,, *glabrous*, n.sp. T
* ,, *graphurus*, Miers. T
* *Lysiosquilla maculata* (Fabricius). T
* *Protosquilla cerebralis*, n.g., n.sp. T
* ,, *elongata*, n.g., n.sp. T

* *Protosquilla guérinii* (White). T
* *Pseudosquilla ciliata*, Miers. T
* *Squilla chlorida*, n.sp. T
* ,, *fasciata*, De Haan. N
* ,, *lata*, n.sp. T
* ,, *nepa*, Latreille. T N
* ,, *quinquedentata*, n.sp. T

Schizopoda :

* *Anchialus angustus*, n.sp. S
* *Euphausia murrayi*, n.sp. S
* *Heteromysis bermudensis*, n.sp. N
Lophogaster typicus, Sars. S
* *Mysidopsis incisa*, n.sp. S
* *Pseudomma australe*, n.sp. S

Macrura :

* *Acanthosoma macrotelsonis*, n.sp. T
* *Alpheus acuto-femoratus*, Dana. T
* ,, *avarus*, Fabricius. T N
* ,, *bermudensis*, n.sp. T N
* ,, *biunguiculatus*, Stimpson. T
* ,, *crassimanus*, Heller. T
* ,, *crinitus*, Dana. T
* ,, *cristidigitus*, n.sp. T
* ,, *edwardsii* (Audouin). T
* ,, *gracilipes*, Stimpson. S
* ,, *intrinsecus*, n.sp. T
* ,, *lævis*, Randall. T
* ,, *leviusculus*, Dana. T
* ,, *longimanus*, n.sp. N
* ,, *minus*, Say. T
* ,, *neptunus*, Dana. T
* ,, *prolificus*, n.sp. T
* ,, *rapax*, Fabricius. T
* ,, *spiniger*, Stimpson. T
* *Arctus immaturus*, n.sp. T N
* ,, *orientalis*, n.sp. T
* ,, *pygmæus*, n.sp. N
* *Arctus tuberculatus*, n.sp. T
* ,, sp. (?). N
* *Artemesia longinaris*, n.g., n.sp. S T
* *Athanas veloculus*, n.sp. T
* *Atya bisulcata* (Randall). T
* ,, *serrata*, n.sp. T
* ,, *sulcatipes*, Newport. T
* *Betæus malleodigitus*, n.sp. T
* ,, *microstylus*, n.sp. T
* *Bithynis grandimanus* (Dana). T
* ,, *lar* (Fabricius). T
* *Brachycarpus audouini*, n.g., n.sp. S
* ,, *savignyi*, n.g., n.sp. N
* *Caricyphus cornutus*, n.g., n.sp. T
* *Caridina typus*, M.-Edwards. T
* *Cheirothrix parvimanus*, n.g., n.sp. T
* *Cheramus orientalis*, n.g., n.sp. T
* *Crangon affinis*, De Haan. N
* ,, *vulgaris*, Fabricius. N
* *Dorodotes levicarina*, n.g., n.sp. T
* *Hetairus debilis*, n.g., n.sp. N
* ,, *gaimardii* (M.-Edwards). N
* ,, *tenuis*, n.g., n.sp. N
* *Hippolyte projecta*, n.sp. N
Ibaccus verdi, n.sp. T
* *Latreutes planus*, n.sp. T
* ,, *unidentatus*, n.sp. T
* *Leptochela gracilis*, Stimpson. N
* ,, *robusta*, Stimpson. S
* ,, *serratorbita*, n.sp. T
* *Nauticaris futilirostris*, n.g., n.sp. N
,, *marionis*, n.g., n.sp. S
* ,, *unirecedens*, n.g., n.sp. T
Nematocarcinus proximatus, n.sp. S T N
* *Nika processa*, n.sp. T
* *Nothocaris binoculus*, n.g., n.sp. T
* ,, *ocellus*, n.g., n.sp. T
* ,, *spiniserratus*, n.g., n.sp. S

* *Oodeopus duplex*, n.g., n.sp. T
* *Palæmon affinis*, M-Edwards. S
* *Pandalus falcipes*, n.sp. N
* *Panulirus penicillatus* (Olivier). T
* *Paralpheus diversimanus* (Olivier). T
* *Parathanas decorticus*, n.g., n.sp. T
* *Penæus anchoralis*, n.sp. T N
* ,, *canaliculatus*, Olivier. S T N
* ,, ,, var. *australiensis*, nov.
,, *fissurus*, n.sp. T
* ,, *gracilis*, Dana. S T
* ,, *incisipes*, n.sp. T
* ,, *indicus*, M.-Edwards. T
* ,, *monodon*, Fabricius. T
,, *philippinensis*, n.sp. T
,, *rectacutus*, n.sp. T
* ,, *tenellus*, n.sp. N
,, *velutinus*, Dana. T N
* *Philonicus* (*Pleoticus*) *mülleri*, n.g., n.sp. S
* ,, (,,) *pectinatus*, n.g., n.sp. T
* *Pontocaris pennata*, n.g., n.sp. T
* *Pontonia meleagrinæ* (Peters). T
* *Sabinea septemcarinata* (Sabine). N
* *Scallasis amboinæ*, n.g., n.sp. T
* *Sicyonia carinata* (Olivier). T
* ,, *lancifer* (Olivier). T
* ,, *sculpta*, M.-Edwards. T
* *Spirontocaris spinus* (Sowerby). N
* *Spongicola venusta*, De Haan. T
* *Stenopus hispidus*, Olivier. T N
* *Synalphæus falcatus*, n.g., n.sp. T
* *Thalassina scorpionoides*, Latreille. T
* *Thenus orientalis*, Rumph. T

ANOMURA :

* *Albunea microps* (White), Miers. T
* *Anapagurus australiensis*, n.sp. S
* ,, *pusillus*, n.sp. S N
* *Birgus latro* (Linné). T
* *Calcinus tibicen* (Herbst). T
* *Catapagurus australis*, n.sp. T
* *Clibanarius strigimanus* (White). S
* *Cœnobita clypeata* (Herbst). T
* ,, *perlata*, M.-Edwards. T
* ,, *rugosa*, M.-Edwards. T
* *Cosmonotus grayii*, Adams and White. T
* *Cryptodromia japonica*, n.sp. N
,, *lateralis* (Gray). S
* ,, *nodulifera*, n.sp. S
* *Diogenes brevirostris*, Stimpson. S
* ,, *custos* (Fabricius). S
* ,, *guttatus*, n.sp. T
* *Dromia ciliata*, n.sp. S
* *Dromidia antillensis*, Stimpson. T
* ,, *spongiosa*, Stimpson. S
Eupagurus comptus (White), var. *jugosa*, nov. S
* ,, *constans*, Stimpson. N
* ,, *excavatus* (Herbst), var. *meticulosa*, Roux. T N
,, *lacertosus*, n.sp., var. *nana*, nov. S.
* ,, *pubescens* (Krøyer), var. *kroyeri*, Stimpson. N.
* ,, (?) sp. T
* *Galathea aculeata*, Haswell. T
* ,, *australiensis*, Stimpson. T
* ,, *dispersa*, Spence Bate. N
* ,, *elegans*, White. T
* ,, *grandirostris*, Stimpson. T
* ,, *labidolepta*, Stimpson. S
* ,, sp. (?). S
* ,, sp. (?). T
* *Homola orientalis*, n.sp. T

* *Hypoconcha panamensis*, Smith. T
* ,, *sabulosa* (Herbst). T
* *Latreillia australiensis*, n.sp. S
* ,, *valida*, De Haan. T
* *Latreillopsis bispinosa*, n.g., n.sp. T
Lyreidus tridentatus, De Haan. S T
* *Mastigochirus quadrilobatus*, Miers. T
* *Munida sancti-pauli*, n.sp. T
* ,, *spinifrons*, n.sp. T
* ,, *spinulifera*, Miers. T
,, *subrugosa* (White). S.
,, ,, var. *australiensis*, nov.
* *Pachycheles barbatus*, M.-Edwards. T
* ,, *pulchellus* (Haswell). T
* *Paguristes hians*, n.sp. T
* ,, *pilosus* (M.-Edwards). S
* ,, sp. (?). T
Pagurodes piliferus, n.g., n.sp. T
* *Pagurus calidus*, Risso. T N
* ,, *dearmatus*, n.sp. T
* ,, *deformis*, M.-Edwards. T
* ,, *euopsis*, Dana. T
* ,, *granulatus*, Olivier. S
* ,, *imbricatus*, M.-Edwards. T
* ,, *similimanus*, n.sp. T
,, *striatus*, Latreille. T
* ,, sp. (?). S
* *Paralomis verrucosus* (Dana). S
Parapagurus abyssorum, M.-Edwards, MS. (deep-water form). S T N
* ,, *latimanus*, n.sp. S
* *Petrolisthes annulipes* (White), Miers. T
* ,, *armatus* (Gibbes). N
* ,, *serratus*, n.sp. T
* ,, *unilobatus*, n.sp. T
* ,, *validus* (Dana). S
* *Petrolisthes violaceus* (Guérin). S
* ,, sp. (?). T
* *Polyonyx obesulus* (White), Miers. T
* *Porcellana sayana* (Leach). T
* ,, *serratifrons*, Stimpson. T
* ,, *streptocheles*, Stimpson. S
* *Porcellanella triloba*, White. S T
* *Pseudodromia latens*, Stimpson. S
* *Raninoides personatus*, White, MS. T
* *Raphidopus ciliatus*, Stimpson. T
* *Remipes scutellatus* (Fabricius). T N
* ,, *testudinarius*, Latreille. T
* *Spiropagurus elegans*, Miers. N
* ,, *spiriger* (De Haan). T
* *Uroptychus tridentatus*, n.sp. (deep-water form ?). T
* *Zanclifer caribensis* (Freminville). T

BRACHYURA :

* *Acanthocyclus gayi*, M.-Edwards and Lucas. S
* *Acanthonyx lunulatus* (Risso). T
* *Achæopsis spinulosus*, Stimpson. S
* *Achæus japonicus*, De Haan. N
* ,, *tenuicollis*, n.sp. S
* *Actæa granulata* (Audouin). T
* ,, *hirsutissima* (Rüppell). T
* ,, *hystrix*, n.sp. T
* ,, *nodulosa*, White. T
* ,, *peronii* (M.-Edwards). S
* ,, *rufopunctata* (M.-Edwards), var. *nodosa*, Stimpson. T
* *Actæodes tomentosus* (M.-Edwards). T
* *Apocremnus septemspinosus*, M.-Edwards. T
* *Arcania septemspinosa* (Fabricius). T N
* *Atergatis floridus* (Linné). T
* *Atergatopsis granulatus*, (M.-Edwards). T

* *Bathyplax typhlus*, M-Edwards, var. *oculiferus*, nov. T
* *Brachynotus* (*Heterograpsus*) *penicillatus* (De Haan). N
* *Calappa depressa*, n.sp. S
* ,, *flammea* (Herbst). S N
* ,, *gallus* (Herbst). T N
* ,, *granulata* (Linné). N
* ,, *hepatica* (Linné). T
* ,, *lophos* (Herbst). S
* *Cancer longipes*, Bell. S
* *Cardiosoma armatum*, Herklots. T
* ,, *carnifex* (Herbst). T
* ,, *guanhumi*, Latreille. N
* *Carpilius maculatus* (Linné). T
* *Carpilodes bellus* (Dana). T
* *Ceratocarcinus longimanus*, Adams and White. T
* *Ceratoplax arcuata*, Miers. T
* ,, *ciliata*, Stimpson. T
* *Chlorinoides coppingeri* (Haswell). S
* *Chorilibinia gracilipes*, Miers. T
* *Cronius bispinosus*, n.sp. T
* *Cryptopodia fornicata* (Fabricius). T
* *Cryptosoma cristatum* (Leach). T
* *Cymopolia caronii*, Roux. T
* ,, *jukesii*, White. T
* *Dehaanius dentatus* (M.-Edwards). S
* *Dorippe facchino* (Herbst). T
* ,, *japonica*, Siebold. N
* *Ebalia lambriformis* (Bell). T
,, *lævis* (Bell). S
,, *tuberculosa* (M.-Edwards). S
* ,, (*Phlyxia*) *crassipes* (Bell). S
* ,, (,,) *dentifrons*, n.sp. S
* ,, (,,) *intermedia*, n.sp. S
* ,, (,,) *quadridentata*, Gray, var. *spinifera*, nov. S
* *Ebalia* (*Phlyxia*) *undecimspinosa* (Kinahan), var. *orbicularis*, Haswell. S
* *Egeria arachnoides* (Rumph). T
* *Epigrapsus politus*, Heller. T
* *Eriphia gonagra* (Fabricius). N
* *Etisus lævimanus*, Randall. T
* *Euplax* (*Chænostoma*) *boscii* (Audouin). T
* *Eurypodius latreillei*, Guérin-Méneville. S
* *Eurytium limosum* (Say). N
* *Gelasimus annulipes*, M.-Edwards. T
* ,, *rubripes*, Jacquinot and Lucas. T
* ,, *tetragonon* (Herbst). T
* ,, *vocans* (Linné). T
* *Geocarcinus lagostoma*, M.-Edwards. T N
* *Geograpsus grayi* (M.-Edwards). T
* *Gomeza bicornis*, Gray. T
* *Gonatorhynchus tumidus*, Haswell. S
* *Goniopsis cruentatus* (Latreille). N
* *Goniosoma cruciferum* (Fabricius). T
* ,, *ornatum*, M.-Edwards. T
* ,, *variegatum* (Fabricius), var. *bimaculatum*, nov. N
* *Gonoplax sinuatifrons*, n.sp. T
* *Grapsus maculatus* (Catesby). T N
* ,, *strigosus* (Herbst). T
* *Halicarcinus ovatus*, Stimpson. S
,, *planatus* (Fabricius). S
* *Helice crassa*, Dana. S
* ,, *latreillei*, M.-Edwards. T
* *Heniplax hirtipes*, Heller. S
* *Herbstia ovata* (Stimpson). T
* ,, *rubra*, M.-Edwards. T
* ,, *violacea* (M.-Edwards). T
* ,, (*Herbstiella*) *depressa* (Stimpson). T

* *Heterocrypta granulata* (Gibbes). T
,, *maltzani*, Miers. N
* *Huenia proteus*, De Haan. T
* *Hyas aranea* (Linné). N
* ,, *coarctata*, Leach. N
* *Hyastenus diacanthus* (De Haan). T
* ,, *oryx*, M.-Edwards. T
* ,, *planasius* (Adams and White). T
* *Hymenosoma orbiculare*, Desmarest. S
* *Hypopeltarium spinosulum* (White). S
* *Iliacantha intermedia*, n.sp. T
* *Inachus leptochirus*, Leach. N
* *Ixa cylindrus* (Fabricius), var. *megaspis*, Adams and White. T
* *Lambrus affinis*, M.-Edwards. T
* ,, *contrarius* (Herbst). T
* ,, *guerinii*, Capello. T
* ,, *intermedius*, Miers. T
,, *longimanus* (Linné). T
* ,, *serratus*, M.-Edwards. T
* ,, *turriger*, White. T
* ,, (*Aulacolambrus*) *hoplonotus*, Adams and White. T
* ,, (*Aulacolambrus*) *hoplonotus*, var. *granulosus*, Miers.
* ,, (*Aulacolambrus*) *hoplonotus*, var. *longioculis*, Miers.
* ,, (*Parthenolambrus*) *calappoides* (Adams and White). T
* ,, (*Parthenolambrus*) *expansus*, Miers. N
* ,, (,,) *massena*, Roux. T N
* ,, (,,) *massena*, var. *atlanticus*, nov.
* *Leptodius exaratus*, var. *sanguineus* (M.-Edwards). T
* ,, *punctatus*, Miers. T
* *Leptograpsus variegatus* (Fabricius). S
* *Leptopodia sagittaria* (Fabricius). T N
* *Leucosia australiensis*, n.sp. S
* ,, *craniolaris* (Linné). T N
* ,, *haswelli*, n.sp. T
* ,, *ocellata*, Bell. T
* ,, *whitei*, Bell. T
* *Libinia gracilipes*, n.sp. S
* *Lissocarcinus lævis*, n.sp. T
* ,, *polybioides*, Adams and White. S
* *Lithadia cariosa*, Stimpson. T
* *Lophactæa granulosa* (Rüppell). T
* ,, *lobata*, M.-Edwards. N
* *Lophozozymus* (*Lophoxanthus*) *bellus*, Stimpson, var. *leucomanus*, Lockington. N
* *Macrocœloma concava*, n.sp. T
* ,, *septemspinosa* (Stimpson). T
* ,, *trispinosa* (Latreille). T N
* *Macrophthalmus podophthalmus*, Eydoux and Souleyet. T
* ,, *serratus*, Adams and White. N
* *Matuta banksii*, Leach. T
* ,, *inermis*, Miers. T
* ,, *lævidactyla*, Miers. S
* ,, *victrix*, Fabricius. T
* ,, ,, var. *crebrepunctata*, Miers.
* *Menæthius monoceros* (Latreille), var. *angusta*, Dana. T
Merocryptus lambriformis, M.-Edwards. S
* *Metopograpsus messor* (Forskål), var. *frontalis*, nov. T

* *Metoporaphis forficulatus*, M.-Edwards. T
* *Micippa spinosa*, Stimpson. S
* ,, ,, var. *affinis*, nov.
* *Micropanope spinipes*, M.-Edwards. T
* *Microphrys bicornutus* (Latreille). N
* *Mithrax cornutus*, Saussure. T
* ,, *coronatus* (Herbst). T
* ,, *forceps* (M.-Edwards). T N
* ,, *hispidus* (Herbst), var. *pleuracanthus*, Stimpson. T
* ,, (*Mithraculus*) *sculptus* (Lamarck). T
* ,, (*Nemausa*) *rostrata*, M.-Edwards. N
* ,, two species undetermined. T
Mursia cristimana (M.-Edwards). S
* *Myctiris longicarpus*, Latreille. T
* ,, *platycheles*, M.-Edwards. S
* *Myra affinis*, Bell. T
* ,, *australis*, Haswell. T
* ,, *darnleyensis*, Haswell. T
* ,, *fugax* (Fabricius). T
* *Myrodes cudactylus*, Bell. T
* *Naxia hirta* (M.-Edwards). T
* *Neptunus* (*Achelous*) *depressifrons* (Stimpson). N
* ,, (,,) *granulatus* (M.-Edwards). T
* ,, (,,) *unispinosus* (Miers). T
* ,, (,,) *whitei* (M.-Edwards). T
* ,, (*Amphitrite*) *gladiator* (Fabricius). T
* ,, (,,) *hastatoides* (Fabricius). T N
* ,, (,,) *hastatus* (Linné). N
* *Neptunus* (*Amphitrite*) *rugosus*, M.-Edwards, T
* ,, (,,) *spinipes*, n.sp. T
* ,, (,,) *tuberculosus*, M.-Edwards. T
* ,, (*Hellenus*) *spinicarpus* (Stimpson). T
* ,, (*Neptunus*) *pelagicus* (Linné). T
* ,, (,,) *sanguinolentus* (Herbst). S T
* ,, (,,) *sayi*, M.-Edwards. N
* *Notolopas brasiliensis*, n.sp. T
* *Notonyx nitidus*, M.-Edwards. T
* *Ocypoda arenaria* (Catesby). T N
* ,, *ceratophthalma* (Pallas). S T
* ,, *cursor* (Linné). T
* ,, sp. (?). S
* *Ommatocarcinus macgillivrayi*, White. S
Oncinopus aranea, De Haan. S T
* *Pachygrapsus transversus*, Gibbes. S T N
* *Panopeus herbstii*, M.-Edwards, var. *serratus*, Saussure. N
* *Pericera cornuta*, M.-Edwards. S
* *Persephona punctata* (Browne). T
* *Philyra platycheira*, De Haan. S
* *Phymodius monticulosus* (Dana). T
* *Picroceroides tubularis*, n.g., n.sp. T
* *Pilumnoplax vestita* (De Haan), var. *sexdentata*, Haswell. N
* *Pilumnus africanus*, M.-Edwards. T
* ,, *brasiliensis*, n.sp. T
* ,, *dehaani*, Miers. T
* ,, *floridanus*, Stimpson. T
* ,, *fragosus*, M.-Edwards. T
* ,, *globosus*, Dana. N

* *Pilumnus labyrinthicus*, Miers. T
* ,, *longicornis*, Hilgendorf. T
* ,, *minutus*, De Haan, var. *hirsutus*, Stimpson. N
* ,, *pulcher*, Miers. T
* ,, *rufopunctatus*, Stimpson. S
* ,, *scabriusculus*, Adams and White. T
* ,, *seminudus*, Miers. T
* ,, *spinifer*, M.-Edwards. N
* ,, *tomentosus*, Latreille. S
* ,, *vestitus*, Haswell. S
* *Pinnotheres villosulus*, Guérin-Méneville. T
* *Pisa* (*Arctopsis*) *tribulus* (Linné). N
* *Plagusia chabrus* (Linné). S
* ,, *depressa* (Fabricius). T
* *Platygrapsus depressus* (De Haan). N
* *Platyonychus bipustulatus*, M.-Edwards. S
* *Podochela riisei* (Stimpson). T N
* *Podophthalmus vigil* (Fabricius). T
* *Portunus corrugatus* (Pennant). S T N
* *Pseudograpsus albus*, Stimpson. T
* *Pseudomicippa* (?) *varians*, Miers. T
* *Pseudozius bouvieri* (M.-Edwards), var. *mellissii*, nov. T
* *Pugettia incisa* (De Haan). N
* *Schizophrys aspera* (M.-Edwards). T
* *Scylla serrata* (Forskål). T
* *Scyra compressipes*, Stimpson. N
* *Sesarma mülleri*, M.-Edwards. T
* ,, *schüttei*, Hess. S
* ,, (*Holometopus*) *aubryi*, M.-Edwards. T
* *Sphærozius nitidus*, Stimpson. N
* *Stenorhynchus falcifer*, Stimpson. S
* ,, *spinifer*, n.sp. T
* *Thalamita admete* (Herbst). T
* *Thalamita crenata* (Rüppell). T
* ,, *integra*, Dana. T
* ,, *intermedia*, n.sp. T
* ,, *prymna* (Herbst). T
* ,, *sexlobata*, n.sp. T
* ,, *sima*, M.-Edwards. S T
* ,, ,, var. *granulata*, nov.
* ,, *stimpsoni*, M.-Edwards. T
* *Thalamonyx danæ*, var. *gracilipes*, M.-Edwards. T
* *Thelphusa sinuatifrons*, M.-Edwards. T
* ,, (*Geothelphusa*) *dehaanii*, White. N
* ,, (*Potamonautes*) *perlata*, M.-Edwards. S
* *Trapezia areolata*, Dana, var. *inermis*, M.-Edwards. T
* ,, *cymodoce* (Herbst). T
* ,, *guttata*, Rüppell. T
* ,, *rufopunctata* (Herbst). T
* ,, ,, var. *intermedia*, nov.
* *Varuna litterata* (Fabricius). T
* *Xantho bidentatus*, M.-Edwards. T
* *Xanthodes melanodactylus*, M.-Edwards. T N
* *Xiphonectes longispinosus* (Dana). T
* *Zozymus æneus* (Linné). T

PYCNOGONIDA :

* *Ascorhynchus minutus*, n.sp. S
Colossendeis megalonyx, n.sp. S
* *Discoarachne brevipes*, n.g., n.sp. S
* *Hannonia typica*, n.g., n.sp. S
* *Nymphon brachyrhynchus*, n.sp. S
* ,, *brevicaudatum*, Miers. S
* ,, *brevicollum*, n.sp. N
* ,, *fuscum*, n.sp. S

* *Nymphon grossipes* (Fabricius). N
Pallene australiensis, n.sp. S
* ,, *lævis*, n.sp. S
* ,, *languida*, n.sp. S
* *Phoxichilidium fluminense*, Krøyer. T
* ,, *insigne*, n.sp. T
,, *patagonicum*, n.sp. S

LAMELLIBRANCHIATA :

Amussium cancellatum, n.sp. T N
* ,, *pleuronectes* (Linné). T
* ,, *scitulum*, n.sp. T
* *Anatina elliptica*, King and Broderip. S
* ,, *siphonata*, Reeve. T
* *Anomia laqueata*, Reeve. N
* *Arca imbricata*, Bruguière. T
* ,, *naviculoris*, Bruguière. T
* ,, *noæ*, Linné. N
* ,, (*Acar*) *congenita*, n.sp. T
* ,, (,,) *domingensis*, Lamarck. T N
* ,, (*Barbatia*) *fasciata*, Reeve. S
* ,, (,,) *fusca*, Bruguière. T
* ,, (,,) *lima*, Reeve. T
* ,, (,,) *radula*, Adams. S
* ,, (,,) *sculptilis*, Reeve. T
* ,, (*Macrodon*) *dalli*, n.sp. N
* ,, (*Scapharca*) *angicostata*, Reeve. T
* ,, (,,) *clathrata*, Reeve. T
* ,, (,, ?) *consociata*, n.sp. T
* ,, (,,) *gubernaculum*, Reeve. S
* ,, (*Trisis*) *semitorta*, Lamarck. T
* *Astarte macandrewi*, Smith. N
* *Avicula macroptera*, Lamarck. T
* ,, (*Meleagrina*) *muricata*, Reeve. T
* ,, (,,) *smaragdina*, Reeve. T
* ,, (,,) *squamulosa*, Lamarck. N

Cardita astartoides, Martens. S
* ,, *beddomei*, n.sp. S
* ,, *bimaculata*, Deshayes. S
* ,, *calyculata* (Linné). S N
* ,, *canaliculata*, Reeve. T
* ,, *dilecta*, n.sp. S
* ,, *excavata*, Deshayes. S
* ,, *insignis*, n.sp. T
* ,, (*Thecalia*) *concamerata* (Chemnitz). S
* ,, sp. (?). S
* *Carditella angasi*, n.sp. S
* ,, *capensis*, n.sp. S
* ,, *infans*, n.sp. T
* ,, *torresi*, n.sp. T
Cardium (*Acanthocardium*) *papillosum*, Poli. N
* ,, (,,) *setosum*, Redfield. T
* ,, (,,) *sueziense*, Issel. T
* ,, (*Bucardium*) *australe*, Sowerby. T
* ,, (,,) *mirabile*, Deshayes. T
* ,, (,,) *multispinosum*, Sowerby. T
* ,, (,,) *pulchellum*, Gray. S
* ,, (,,) *tenuicostatum*, Lamarck. S T
* ,, (*Fragum*) *fornicatum*, Sowerby. T
* ,, (,,) *imbricatum*, Sowerby. T
* ,, (,,) *medium*, Linné. T
* ,, (,,) *torresi*, n.sp. T
* ,, (*Lævicardium*) *norvegicum*, Spengler. T

* *Cardium* (*Papyridea*) *bullatum* ((Linné ?) Chemnitz). T
* ,, (,,) *semisulcatum*, Gray. S
,, (,,) *transversale*, Deshayes. N
* *Chama brassica*, Reeve. T
* ,, *carditæformis*, Reeve. T
,, *gryphoides*, Linné. N
* ,, *jukesii*, Reeve. T
* ,, *spinosa*, Broderip. S
* ,, *sulphurea*, Reeve. T
* *Circe amica*, n.sp. T
* ,, *angasi*, n.n. S
* ,, *australis*, Sowerby. T
* ,, *fastigiata*, Sowerby. T
* ,, *gibbia* (Lamarck). T
* ,, *gordoni*, n.sp. T
* ,, *jucunda*, n.sp. T
,, *minima* (Montagu). N
* ,, *obliquissima*, n.sp. T
* ,, *scripta* (Linné). S T
* ,, *sulcata*, Gray. T
* *Clavagella torresi*, n.sp. T
* *Clementia papyracea* (Gray). T
* *Cœlodon elongatus*, Carpenter. T
* *Corbula crassa*, Hinds. T
* ,, *macgillivrayi*, n.sp. T
* ,, *modesta*, Hinds. T
* ,, *monilis*, Hinds. T
* ,, *scaphoides*, Hinds. T
* ,, *tunicata*, Hinds. S T
* *Crassatella aurora*, Adams and Angas. S
* ,, *rhomboides*, n.sp. T
* ,, *torresi*, n.sp. T
* *Cryptodon bullulus* (Reeve). T
* ,, *falklandicus*, n.sp. S
* ,, *rufolineatus*, n.sp. T
* *Cytherea* (*Callista*) *chione*, Linné. N
* *Cytherea* (*Callista*) *disrupta*, Sowerby. S
* ,, (,,) *lilacina*, Lamarck. T
* ,, (,,) *multistriata*, Sowerby. S
* ,, (,,) *roseotincta*, n.sp. T
* ,, (,,) *rutila*, Sowerby. S
* ,, (*Caryatis*) *coxeni*, Smith. T
* ,, (,,) *hebræa*, Lamarck. T
* ,, (,,) *regularis*, n.sp. T
* ,, (,,) *rostrata*, Koch. S
* ,, (*Dione*) *philippinarum*, Hanley. T
Davila (?) *umbonata*, n.sp. S
* *Diplodonta amboinensis*, n.sp. T
* ,, *apicalis*, Philippi. N
* ,, *conspicua*, n.sp. T
* ,, *corpulenta*, n.sp. T
* ,, *scalpta*, n.sp. T
* ,, *subglobosa*, n.sp. T
* ,, *subgranulosa*, n.sp. T
* ,, sp. (?). S
* *Donax nitidus*, Deshayes. S T
* *Dosinia circinaria*, Deshayes. S
* ,, *deshayesii*, Adams. T
* ,, *histrio* (Gmelin). T
* ,, *lambata* (Gould). S
* ,, *mira*, n.sp. T
* ,, *sculpta* (Hanley). T
* *Ervilia bisculpta*, Gould. S T
,, *castanea* (Montagu). N
* ,, *sandwichensis*, n.sp. T
,, *subcancellata*, n.sp. T N
* *Gastrochæna dubia* (Pennant). T N
* ,, *lamellosa*, Deshayes. T
* *Julia exquisita*, Gould. T
* *Kellia adamsi* (Angas). S
* ,, *cardiformis*, n.sp. S
* ,, *rotunda* (Deshayes). S
* ,, *suborbicularis* (Montagu). S
* *Leda corbuloides*, n.sp. T

* *Leda crassa* (Hinds). S
* ,, *ensicula*, Angas. S
* ,, *lata*, Hinds. T
* ,, *micans*, Adams. T
* ,, *novæ-guineensis*, n.sp. T
* *Lima angulata*, Sowerby. S
,, *lata*, n.sp. T
,, *multicostata*, Sowerby. S T N
* ,, *squamosa*, Lamarck. T N
* ,, *tahitensis*, n.sp. T
* ,, (*Ctenoides*) *tenera*, Chemnitz. T
* ,, (*Limatula*) *bullata* (Born). S
,, (,,) *pygmæa*, Philippi. S
* ,, (,,) *torresiana*, n.sp. T
* ,, (*Mantellum*) *hians*, Gmelin. N
* *Limopsis bassi*, n.sp. S
* ,, *brazieri*, Angas. S
* ,, *cancellata* (Reeve). T
,, *minuta* (Philippi). T N
* *Lithodomus antillarum* (Philippi). N
* ,, *appendiculatus* (Philippi). N
* ,, *malaccanus*, Reeve. T
* *Lucina columbella*, Lamarck. T
* ,, *ramsayi*, n.sp. S
* ,, (*Codakia*) *fijiensis*, n.sp. T
* ,, (,,) *hawaiiensis*, n.sp. T
* ,, (,,) *interrupta* (Lamarck). T
* ,, (,,) *levukana*, n.sp. T
,, (,,) *pecten*, Lamarck. T N
* ,, (,,) *pisum*, Reeve. T
* ,, (,,) *seminula*, Gould. T
* ,, (,,) sp. (?). T
* ,, (*Divaricella*) *irpex*, n.sp. T
* ,, (*Loripes*) *desiderata*, n.sp. T
* ,, (,, ?) *gordoni*, n.sp. T
* ,, (,, ?) *jacksoniensis*, n.sp. S
* *Mactra achatina*, Chemnitz. T
* ,, *decora*, Deshayes. T
* *Mactra incarnata*, Deshayes. T
* ,, *incerta*, n.sp. T
* ,, *isabelleana*, d'Orbigny. S
* ,, *jacksoniensis*, n.sp. S
* ,, *pusilla*, Adams. S
* ,, (*Mactrinula*) *depressa*, Reeve. S
* ,, (,,) *plicataria*, Linné. T
* *Malletia gigantea*, Smith. S
* *Malleus albus*, Lamarck. T
* *Martesia striata* (Linné). T
* *Modiola barbata* (Linné). N
* ,, *glaberrima* (Dunker). S
* *Modiolarca kerguelensis*, n.sp. S
,, *trapezina* (Lamarck). S
* *Modiolaria cumingiana*, Dunker. S
* ,, *cuneata*, Gould. S
* ,, *lanigera* (Dunker). S
* ,, *varicosa*, Gould. S
* *Montacuta angasi*, n.sp. S
* ,, *paula* (Adams). T
* *Mya* sp. (?). T
* *Myochama anomioides*, Stutchbury. S
* *Myodora angustata* (Angas). S
* ,, *australica* (Reeve). S
* ,, *brevis* (Sowerby). S
* ,, *crassa* (Stutchbury). S
* ,, *pandoriformis* (Stutchbury). S
* ,, *trigoni*, Reeve. T
* ,, two species undetermined. T
* *Mytilus edulis*, Linné. S
,, *exustus* (Lamarck), Reeve. T
* ,, *hirsutus*, Lamarck. S
* ,, *kerguelensis*, n.sp. S
* ,, *magellanicus*, Chemnitz. S T
* ,, *sulcatus* (Lamarck ?), Reeve. T
* ,, (*Starelia*) *horridus*, Dunker. T
* *Neæra brazieri*, n.sp. S
* ,, *elegans*, Hinds. T

* *Nucula nitidula*, Adams. S
* ,, *obliqua*, Lamarck. T
* ,, *uruguayensis*, Smith. S
* ,, (*Acila*) *mirabilis*, Adams and Reeve. N
* *Nuculina ovalis* (Wood). S
* *Ostrea imbricata*, Lamarck. T
* *Pecten amicus*, n.sp. T
* ,, *asperrimus*, Lamarck. S
* ,, *corallinoides*, d'Orbigny. T N
* ,, *lemniscatus*, Reeve. T
* ,, *leopardus*, Reeve, var. *solaris*, Sowerby. T
,, *limatula*, Reeve. S
* ,, *noronhensis*, n.sp. T
* ,, *patagonicus*, King. S
,, *pusio* (Linné). N
* ,, *senatorius* (Gmelin). T
* ,, *undulatus*, Sowerby. S
,, *vitreus* (Chemnitz). S T N
* ,, (*Janira*) *fumatus*, Reeve. S
* ,, (,,) *laqueatus*, Sowerby. N
* *Pectunculus beddomei*, n.sp. S
* ,, *formosus*, Reeve. T
* ,, *holosericus*, Reeve. S
* ,, *pectinatus* (Gmelin). T
* ,, *stellatus* (Bruguière). N
* ,, *striatularis*, n.sp. (?) (Lamarck ?), Reeve. S T
* ,, *vitreus*, Lamarck. T
* *Periploma compressa*, d'Orbigny. S
* *Perna samoensis*, Baird. T
* ,, *vitrea*, Reeve. T
* *Petricola lapicida* (Chemnitz). T
* *Pinna tasmanica*, Woods. S
* *Plicatula ramosa*, Lamarck. S
* ,, sp. (?). T
* *Psammobia anomala*, Deshayes. T
* ,, *castrensis* (Spengler). T
* *Psammobia costulata*, Turton. N
* ,, *intermedia*, Deshayes. T
* ,, *lineolata*, Gray. S
* ,, *modesta*, Deshayes. S
* ,, *pallida*, Deshayes. T
* ,, *pulcherrima*, Deshayes. T
* ,, *zonalis* (Lamarck). S
* ,, sp. (?). T
* *Raeta pulchella* (Adams and Reeve). N
Saxicava arctica, Linné. S N
* *Semele amabilis*, Adams. T
* ,, *infans*, n.sp. T
* ,, (*Theora*) *iridescens* (Hinds). T
* *Septifer bilocularis* (Linné). T
* *Solecurtus* (*Azor*) *coarctatus* (Gmelin). T
* *Solen sloanii*, Gray. S
* *Spondylus victoriæ*, Sowerby. T
* ,, *zonalis*, Lamarck. T
* *Tapes obscurata*, Deshayes. T
* ,, (*Amygdala*) *exalbida* (Chemnitz). S
* ,, (,,) *fabagella* Deshayes. S
* ,, (,,) *intermedia* (Quoy and Gaimard). S
* ,, (*Paratapes*) *semirugata* (Philippi). T
* ,, (,,) *textrix* (Chemnitz). S
* ,, (,,) *undulata*, Born. T N
* *Tellina compacta*, n.sp. T
* ,, (*Angulus*) *lux*, Hanley. T
* ,, (,,) *natalensis*, Krauss. S
* ,, (,, ?) *rhomboides*, Quoy and Gaimard. T
* ,, (,,) *valtonis*, Hanley. T
* ,, (,,) *vernalis*, Hanley. T
* ,, (*Arcopagia*) *elegantissima*, n.sp. T
* ,, (,,) *pretiosa*, Deshayes. T

* *Tellina* (*Macoma*) *arafurensis*, n.sp. T
* ,, (,,) *consociata*, n.sp. T
* ,, (,,) *uruguayensis*, n.sp. S
* ,, (*Tellinella*) *charlottæ*, n.sp. S
* ,, (,,) *huttoni*, n.sp. S
* ,, (,,) *verrucosa*, Hanley. T
* ,, (——— ?) *casta*, Hanley. T
* ,, (——— ?) *fijiensis*, Sowerby. T
* ,, (——— ?) *languida*, n.sp. T
* ,, (——— ?) *semen*, Hanley. T
* ,, (——— ?) *semitorta*, Sowerby. S
* ,, (——— ?) *tenuilamellata*, n.sp. T
* ,, (——— ?) *tenuilirata*, Sowerby. S T
Thracia meridionalis, n.sp. S
* ,, *modesta* (Angas). S
* ,, *myodoroides*, n.sp. S
* ,, *watsoni*, n.sp. S
* *Tridacna crocea*, Lamarck. T
* ,, *gigas*, Linné. T
* *Trigonia lamarckii*, Gray. S
* ,, *margaritacea*, Lamarck. S
* ,, *uniophora*, Gray. T
* *Venerupis irus* (Linné). N
* *Venus torresiana*, Smith. T
* ,, (*Anaitis*) *paphia*, Linné. T
* ,, (*Antigona*) *lamellaris* (Schumacher). T
* ,, (,,) *puerpera*, Linne. T
,, (*Chamelæa*) *mesodesma*, Quoy and Gaimard. N
* ,, (*Chione*) *calophylla*, Philippi. S T
* ,, (,,) *foliacea*, Philippi. T
* ,, (,,) *infans*, n.sp. T
* ,, (,,) *jacksoni*, n.sp. S
* ,, (,,) *levukensis*, n.sp. T
* ,, (,,) *lionota*, n.sp. T
* ,, (,,) *marica*, Linné. T
* *Venus* (*Chione*) *mindanensis*, n.sp. T
* ,, (,,) *ovata*, Pennant. N
* ,, (,,) *recognita*, n.sp. T
* ,, (,,) *scabra*, Hanley. N
* ,, (,,) *striatissima*, Sowerby. S
* ,, (*Gomphina*) *undulosa*, Lamarck. T
* ,, (*Leukoma*) *australis*, Sowerby. S
* ,, (*Ventricola*) *casina*, Linné. N
,, (,,) *effossa*, Bivona. N
* *Yoldia isonata*, Martens. S
* ,, *subæquilateralis*, Smith. S

Scaphopoda and Gasteropoda :

* *Aclis mizon*, n.sp. N
* *Aemæa dorsuosa* (Gould). N
* ,, *saccharina* (Linné). N
* ,, sp. (?). T
* *Aetæon austrinus*, n.sp. S
* ,, *flammeus* (Gmelin). T
* ,, (*Acteonina*) *edentulus*, n.sp. S
* ,, (*Buccinulus*) *affinis* (Adams). S
* ,, (,,) *insculptus* (Reeve). T
* ,, (,,) *niveus*, Angas. S
* *Adeorbis* sp. (?). T
* *Alaba* (*Diala*) *albugo*, n.sp. T
* ,, (,,) *phasianella*, Angas. S
* ,, (,,) n.sp. (?). S
* ,, (*Styliferina* ?) *fulva*, n.sp. T
* ,, (,,) *gonioehila*, Adams. T
* ,, (,,) *striata*, n.sp. T
* ,, (,,) *sulcata*, n.sp. T
* ,, two species undetermined. T
* *Amalthea acuta* (Quoy and Gaimard). T
* ,, *australis*, Lamarck. T
* *Amphisphyra* sp. (?). T
* *Ancilla* (*Amalda*) *oblonga* (Sowerby). S
* ,, (*Anaulax*) *montrouzieri* (Souverbie). S

* *Ancilla* (*Anaulax*) *mucronata* (Sowerby). S
* ,, (,,) *nana*, n.sp. S
* ,, (,,) *obtusa* (Swainson). S
* ,, (*Dipsaccus*) *cingulata* (Sowerby). T
* *Aplustrum scabrum* (Chemnitz). S
* *Aplysia depilans*, Linné. S
* *Aporrhais cancellata* (Lamarck). T
* *Assiminea* sp. (?). S
* ,, sp. (?). T
* *Atys cylindrica* (Helbling). T
* ,, *debilis*, Pease. T
* ,, *hyalina*, n.sp. T
* ,, *parallela*, Gould. T
* ,, (*Dinia*) *dentifera*, Adams. T
* ,, three species undetermined. T
* *Barleeia imbricata*, n.sp. T
* *Bittium amboynense*, n.sp. T
* ,, *cylindricum*, n.sp. S
* ,, *diplax*, n.sp. T
* ,, *furvum*, n.sp. S
* ,, *granarium* (Kiener). S
* ,, *lacteum* (Philippi). N
* ,, *leucocephalum*, n.sp. T
* ,, *oosimense*, n.sp. N
* ,, *perparvulum*, n.sp. T
* ,, *pupiforme*, n.sp. T
,, *reticulatum* (Costa). N
* ,, *xanthum*, n.sp. T
* ,, six species undetermined. T
* ,, sp. (?). S
* ,, sp. (?). N
* *Buccinum albozonatum*, n.sp. S
* ,, two species undetermined. S
* *Bulla ampulla*, Linné. S
* ,, *australis*, Quoy and Gaimard. S T
* *Bullia lævigata* (Chemnitz). S
* *Bullia* (*Buccinanops*) *gradata* (Deshayes). S
Cadulus simillimus, n.sp. T
* *Cæcum angustum*, n.sp. T
* ,, *attenuatum*, n.sp. T
* ,, *chinense*, de Folin. T
* ,, *crystallinum*, n.sp. T
* ,, *eburneum*, n.sp. T
* ,, *elegantissimum*, Carpenter. N
* ,, *exile*, n.sp. T
* ,, *microcyclus*, n.sp. T
* ,, *pollicare*, Carpenter. N
* ,, *sepimentum*, de Folin. T
* ,, ,, var. *arcuata*, de Folin. T
* ,, *subflavum*, n.sp. T
* ,, *succineum*, n.sp. T
* ,, *vitreum*, Carpenter. N
* ,, eight species undetermined. T
* *Calyptræa calyptræformis* (Lamarck). S
* ,, *pileus* (Lamarck). S
* ,, sp. (?). S
* *Cancellaria spengleriana*, Deshayes. N
* ,, *undulata*, Sowerby. S
* ,, (*Admete*) *carinata*, n.sp. S
* ,, (,,) *specularis*, n.sp. S
* ,, (,,) sp. (?). S
* *Capulus japonicus*, Adams. T
* ,, (*Amathina*) *tricarinatus* (Linné). T N
* ,, (?) sp. T
* *Cassis* (*Casmaria*) *turgida*, Reeve. T
* ,, (*Semicassis*) *pila*, Reeve. S T
* ,, sp. (?). S
* *Cerithiopsis balteata*, n.sp. T
* ,, *ridicula*, n.sp. T
* ,, *turrigera*, n.sp. T
* ,, twelve species undetermined. T

* *Cerithiopsis*, three species undetermined. N
* *Cerithium balteatum*, Philippi. T
* ,, *carbonarium*, Philippi. N
* ,, *columna*, Sowerby. T
* ,, *dubium*, Sowerby. T
* ,, *lessium*, n.sp. T
* ,, *novæhollandiæ*, Adams. T
* ,, *phoxum*, n.sp. T
* ,, *salebrosum*, Sowerby. T
* ,, *tuberculatum*, Linné, var. *variegatum*, Quoy. T
* ,, *vulgatum*, Bruguière. S
* ,, (*Lampania*) *australe*, Quoy and Gaimard. S
* ,, (*Vertagus*) *articulatum*, Adams and Reeve. T
* ,, (,,) *asperum* (Linné). T
* ,, (,,) *kochi*, Philippi. T
* ,, (,,) *martinianum*, Pfeiffer. T
* ,, (,,) *turritum*, Sowerby. T
* ,, (,,) n.sp. (?). T
* ,, three species undetermined. T
* ,, sp. (?). S
* *Cithara* (?) sp. S
* *Cithna* (?) sp. T
* *Clathurella* (*Daphnella*) *aulacoëssa*, n.sp. T
* *Cocculina angulata*, n.sp. T
* *Columbella mercatoria* (Linné). S T
* ,, *rustica* (Linné). T N
* ,, *versicolor*, Sowerby. N
* ,, (*Atilia*) *filosa*, Angas. S
* ,, (,,) *puella*, Sowerby. S
* ,, (*Conidea*) *flava* (Bruguière). T
* *Columbella* (*Mitrella*) *albina*, Kiener. T
* ,, (,,) *albomaculata*, Angas. S
* ,, (,,) *australis*, Gaskoin. S
* ,, (*Pusiostoma*) *mendicaria* Linné. T
* ,, (*Zafra*) *troglodytes*, Souverbie. T
* ,, five species undetermined. T
* ,, three species undetermined. S
* *Cominella porcata* (Gmelin). S
* ,, (*Adamsia*) *typica*, Dunker. S
* *Conus* (*Cylinder*) *textile*, Linné. T
* ,, (*Cylindrella*) *sulcatus*, Hwass. T
* ,, (*Hermes*) *croceus*, Smith. T
* ,, (*Leptoconus*) *anemone*, Lamarck. S
* ,, (,,) *jukesii*, Reeve. S
* ,, (,,) *lizardensis*, Crosse. T
* ,, (,,) *nisus*, Chemnitz. T
* ,, (,,) *trigonus*, Reeve. T
* ,, (,,) *vittatus*, Hwass. T
* ,, (*Lithoconus*) *eburneus*, Hwass. T
* ,, (,,) *quercinus*, Hwass. T
* ,, (*Puncticulis*) *arenatus*, Hwass. T
* ,, (,,) *pulicarius*, Hwass. T
* *Coralliophila wahlbergi* (Krauss). S
* *Crepidula aculeata* (Gmelin). S N
* ,, *dilatata*, Lamarck. S
* ,, *fornicata* (Linné). T
* ,, *immersa* (Angas). S
* ,, *onyx*, Sowerby. S
* *Crossea striata*, n.sp. T
* *Cyclostrema*, fourteen species undetermined. T
* ,, three species undetermined. S

* *Cylichna arachis* (Quoy and Gaimard). S
* ,, *cuticulifera* (Smith). S T
* ,, *labiata*, n.sp. T
* ,, *noronyensis*, n.sp. T
* ,, *reticulata*, n.sp. T
* ,, *subreticulata*, n.sp. T
* ,, *tahitiensis*, n.sp. T
* ,, (*Mnestia*) *bizona*, Adams. T
* ,, (*Volvula*) *sulcata*, n.sp. T
* ,, eight species undetermined. T
* *Cypræa bicolor*, Gaskoin. T
* ,, *cylindrica*, Born. T
* ,, *lynx*, Linné. T
* ,, *microdon*, Gray. T
* ,, *miliaris*, Gmelin. T
* ,, *piperata*, Solander. S
,, *spurca* (Linné). T N
* ,, *teres*, Gmelin. T
* ,, *vitellus*, Linné. T
* ,, (*Trivia*) *australis*, Lamarck. S
* ,, (,,) *candidula*, Gaskoin. N
* ,, (,,) *pellucidula*, Gaskoin. T
* ,, sp. (?). T
* *Dentalium dentalis*, Linné. S N
,, *entalis*, Linné, var. *striolatum*, Stimpson. S T N
* ,, *javanum*, Sowerby. T
* ,, *longitrorsum*, Reeve. T
* ,, *tornatum*, n.sp. T
* ,, *yokohamense*, n.sp. N
* *Dolabrifera triangularis*, n.sp. S
* *Dolium perdix* (Linné). T
* *Eatoniella caliginosa* (Smith). S
* ,, *subrufescens* (Smith). S
* *Eburna* (*Zemira*) *australis*, Sowerby. S
* *Emarginula* (*Hemitoma*) *rugosa*, Quoy and Gaimard. S
* ,, (*Scutus*) *anatina* (Donovan). S
* *Emarginula* (*Tugalia*) *parmophoidea*, Quoy and Gaimard. S
* *Eulima acanthyllis*, n.sp. T
* ,, *dissimilis*, n.sp. S
* ,, *fallax*, n.sp. T
* ,, *latipes*, n.sp. T
* ,, *martinii*, Adams. T
* ,, *oxytata*, n.sp. T
* ,, *philippii*, Weinkauff. N
* ,, nine species undetermined. T
* *Eulimella angusta*, n.sp. T
* ,, *coacta*, n.sp. T
* ,, *subtilis*, n.sp. T
* *Fasciolaria armata* (Adams). N
* ,, *coronata*, Lamarck. S
* ,, *trapezium* (Linné). T
* ,, (*Latirus*) *contempta*, Adams. T
* ,, (,,) *strangei*, Adams. T
* ,, sp. (?). S
* *Fissurella crassa*, Lamarck. S
* ,, *maxima*, Sowerby. S
* ,, *mutabilis*, Sowerby. S
* ,, *picta* (Gmelin). S
* ,, (*Lucapina*) *fumata*, Reeve. S
Fossarus ambiguus (Linné). T
* *Fusus colosseus*, Lamarck. T
* ,, *colus* (Linné). T
* ,, *hanleyi* (Angas). S
* ,, *marmoratus*, Philippi. T
* ,, *novæhollandiæ*, Reeve. S
* ,, *pyrulatus*, Reeve. S
* ,, *verruculatus*, Lamarck. S
* ,, (*Euthria*) *chloroticus*, Martens. S
* ,, (,,) *fuscatus* (Bruguière). S
,, (*Neptunea*) *mandarinus*, Duclos. S
* ,, (,,) *nodosus* (Martyn). S

* *Fusus* (*Neptunea*) *regulus*, n.sp. S
* ,, (*Sipho*) *pyrrhostoma*, n.sp. S
* ,, sp. (?). T
* *Haliotis nævosa*, Martyn. S
* ,, *varia*, Linné. T
* *Harpa nobilis*, Lamarck. T
* *Hydrobia caliginosa* (Gould). S
* *Jeffreysia* sp. (?). S
* *Lachesis* (?) sp. T
* *Lamellaria*, four species undetermined. S
* ,, sp. (?). T
* *Latirus*, two species undetermined. T
* *Leucorhynchia* (?) sp. T
* *Litorina cincta*, Quoy and Gaimard. S
* ,, *mauritiana* (Lamarck). S
* ,, *peruviana* (Lamarck). S
* ,, *pintado* (Wood). T
* ,, *punctata*, Gmelin. T
* ,, *setosa*, Smith. S
* ,, *striata*, King. N
* ,, (*Hamus*) *granularis*, Gray. N
* ,, (,,) *montrouzieri* (Fischer). T
* ,, (,,) *nodulosa*, d'Orbigny. T
* *Marginella fulminata*, Kiener. T
* ,, (*Gibberula*) *guancha*, d'Orbigny. N
,, (,,) *miliaria* (Linné). N
* ,, (*Glabella*) *agapeta*, n.sp. S
* ,, (,,) *chrysea*, n.sp. S
* ,, (,,) *turbinata*, Sowerby. S
* ,, (*Persicula*) *ovulum*, Sowerby. S
* ,, (,,) *sagittata*, Hinds. T
* *Marginella*, ten species undetermined. T
* ,, five species undetermined. S
* *Mathilda* (*Cingulina*) *spina* (Crosse and Fischer). S
* ,, three species undetermined. T
* *Mitra* (*Callithea*) *granosa* (Chemnitz). T
* ,, (,,) *obeliscus*, Reeve. T
* ,, (*Cancilla*) *cyri*, Dohrn. T
* ,, (,,) *filaris* (Linné). T
,, (,,) *interlirata*, Reeve. T
* ,, (,,) *reticulata*, Adams. T
* ,, (,,) *rufescens*, Adams. T
* ,, (,,) *verrucosa*, Reeve. T
* ,, (*Costellaria*) *amanda*, Reeve. T
* ,, (,,) *exasperata* (Chemnitz). T
* ,, (,,) *fusiformis*, Kiener. T
* ,, (,,) *nodilirata*, Adams. T
* ,, (,,) *radius*, Reeve. T
* ,, (,,) *sculptilis*, Reeve. T
* ,, (,,) two species undetermined. T
* ,, (*Nebularia*) *glabra*, Swainson. S
* ,, (,,) *rhodia*, Reeve. S
* ,, (*Pusia*) *cineracea*, Reeve. S T
* ,, (,,) *nodulifera*, Adams. T
* ,, (*Scabricola*) *crenifera*, Lamarck. T
* ,, (,,) *sphærulata*, Martyn. T
* ,, sp. (?). T
* ,, sp. (?). S
Mitrularia uncinata (Reeve). T N
* *Mucronalia xanthias*, n.sp. T
* *Murex* (*Chicoreus*) *cervicornis*, Lamarck. T
* ,, (,,) *maurus*, Broderip. T
* ,, (,,) *monodon*, Sowerby. T

* *Murex* (*Chicoreus*) *palmiferus*, Sowerby. S
* ,, (*Phyllonotus*) *endivia*, Lamarck. T
,, (,,) *zelandicus*, Quoy and Gaimard. S T
* ,, (*Pseudomurex*) *pauper*, n.sp. T
* ,, (,,) *pholidotus*, n.sp. T
* ,, (*Pteronotus*) *acanthopterus*, Lamarck. T
* ,, (,,) *cordismei*, n.sp. S
* ,, (,,) *triformis*, Reeve. S
* ,, (*Tribulus*) *acanthodes*, n.sp. T
* ,, (,,) *acanthostephes*, n.sp. T
* ,, (,,) *aduncospinosus* (Beck), Reeve. T
* ,, (,,) *macgillivrayi*, Dohrn. T
* ,, (,,) *nigrospinosus*, Reeve. T
* ,, (,,) *tenuispina*, Lamarck. T
* ,, (,,) *ternispina*, Lamarck. T

* *Nassa agapeta*, n.sp. T
* ,, (*Alectryon*) *glans* (Linné), var. *suturalis* (Lamarck). S
* ,, (,,) *monile* (Kiener). T
* ,, (*Arcularia*) *granifera* (Kiener). T
* ,, (*Cæsia*) *limata* (Chemnitz). N
* ,, (*Hebra*) *echinata*, Adams. T
* ,, (,,) *muricata* (Quoy and Gaimard). T
* ,, (*Hima*) *capillaris*, n.sp. T
* ,, (,,) *paupera*, Gould. S

* *Nassa* (*Niotha*) *gemmulata* (Lamarck). T
* ,, (,,) *pauperata* (Lamarck). S
* ,, (,,) *ravida*, Adams. T
* ,, (,,) *siquijorensis*, Adams. N
* ,, (,,) *sordida*, Adams. T
* ,, (,,) *stigmaria*, Adams. T
* ,, (*Zeuxis*) *algida*, Reeve. T
* ,, (,,) *canaliculata* (Lamarck). T
* ,, (,,) *crenulata*, Bruguière. N
* ,, (,,) *levukensis*, n.sp. T
* ,, sp. (?). T

* *Nassaria amboynensis*, n.sp. T
* ,, *sinensis*, Sowerby. T
* ,, *suturalis*, Adams, var. *bitubercularis*, Adams. T

* *Natica affinis* (Gmelin). N
* ,, *atypha*, n.sp. T
* ,, *effossa*, n.sp. S
* ,, *euzona*, Recluz. S
,, *fartilis*, n.sp. S
* ,, *grisea*, Martens. S
* ,, *pseustes*, n.sp. T
* ,, *rufa* (Born). T
* ,, *sagittata*, Menke. S
* ,, *seychellium*, Watson. T
,, *variabilis*, Recluz. N
* ,, (*Amauropsis*) *perscalpta*, Martens. S
* ,, (,,) *suturalis*, n.sp. S
* ,, (*Lunatia*) *grönlandica*, Beck. S
* ,, (,,) *prasina*, n.sp. S
* ,, (*Mamma*) *aurantia*, Lamarck. T
* ,, (,,) *draparnaudi*, Recluz. T
* ,, (,,) *mamilla* (Linné). T
* ,, (,,) *porcellana*, d'Orbigny. T

* *Natica* (*Neverita*) *albumen* (Linné). T
* „ („) *conica*, Lamarck. S
* „ („) *didyma*, Bolten. S
* „ three species undetermined. T
* *Neobuccinum eatoni*, Smith. S
* „ *restitum* (Martens). S
* *Nerita albicilla*, Linné. T
* „ *ascensionis*, Gmelin. T
* „ *chamæleon*, Linne. T
* „ *punctata*, Quoy and Gaimard. S
* *Neritina* sp. (?). T
* *Odostomia convoluta*, n.sp. T
* „ *corpulenta*, n.sp. T
* „ *kymatodes*, n.sp. T
* „ *oödes*, n.sp. T
* „ *oxia*, n.sp. T
* „ *pupa*, n.sp. T
* „ *scopulorum*, n.sp. T
„ *turrita*, Hanley. T N
* „ (*Parthenia*) *casta* (Adams). S
* „ („) sp. (?) T
* „ (*Syrnola*) *aciculina*, Sowerby. T
* „ (*Turbonilla?*) *amæbæa*, n.sp. T
* „ („) *dipsycha*, n.sp. T
* „ („) „ var. *incerta*, nov.
* „ („) *homœotata*, n.sp. T
* „ („) *rhabdoïdes*, n.sp. T
* „ („) *scalpidens*, n.sp. S
* „ („) seven species undetermined. T
* „ about twenty species undetermined. T
* *Oliva rufula*, Duclos. T
* „ (*Galeola*) *picta*, Reeve. T
* *Oliva* (*Ispidula*) *australis*, Duclos. T
* „ (*Olivella*) *fulgida*, Reeve. T
* „ („) *leucozona*, Adams and Angas. S
* „ („) *nympha*, Adams and Angas. S
* „ („) *pulchella*, Duclos. T
* „ three species undetermined. T
* *Parastrophia challengeri*, n.sp. T
* *Patella alticostata*, Angas. S
* „ *fuegiensis*, Reeve. S
* „ *granatina*, Linné. S
* „ *kerguelensis*, Smith. S
* „ *tramoserica*, Martyn. S
* *Phasianella pulla* (Linné). N
* „ seven species undetermined. T
* *Philine angasi* (Crosse). S
* „ *aperta* (Linné). T N
* „ *orientalis*, Adams. T
„ *quadrata* (Wood). N
* „ three species undetermined. N
* „ two species undetermined. S
* *Phos nodicostatus*, Adams. T
* „ *roseatus*, Hinds. T
* „ *scalarioïdes*, Adams. T
* „ *senticosus* (Linné). T
* „ (*Strongylocera*) *angulatus*, Sowerby. T
* „ („) *sculptilis*, Adams. T
* *Pisania* (*Cantharus*) *lineata* (Gmelin). T
* „ („) *undosa* (Linné). T
* *Planaxis sulcata* (Born). T
* *Pleurobranchus*, two species undetermined. S
* *Pleurotoma marmorata*, Lamarck. T
* „ *monilifera* (Pease). T
* „ *speciosa*, Reeve. T

* *Pleurotoma tigrina*, Lamarck. T
* ,, *undosa*, Lamarck. T
* ,, *xanthophaës*, n.sp. S
* ,, (*Crassispira*) *owenii*, Gray. S
* ,, (*Drillia*) *climacota*, n.sp. T
* ,, (,,) *kymatoessa*, n.sp. S
* ,, (,,) *laterculata*, Sowerby. T
* ,, (,,) *latisinuata*, Smith. T
* ,, (,,) *metcalfei*, Angas. S
* ,, (,,) *quoyi*, Desmoulins. S
* ,, (,,) *spadix*, n.sp. S
* ,, (,,) *sterrha*, n.sp. T
* ,, (*Mangelia*) *levukensis*, n.sp. T
* ,, (,,) *nitens* (Hinds). T
* ,, (*Spirotropis*) *studeriana*, Martens. S
* ,, (*Surcula*) *brevicaudata*,
* ,, Reeve. T
* ,, (,,) *leucotropis*, Adams and Reeve. T
* ,, (,,) *oxytropis*, var. *albi carinata*, Sowerby. S
* ,, (,,) *tuberculata*, Gray. T
* ,, (*Thesbia*) *corpulenta*, n.sp. S
* ,, (,,) *platamodes*, n.sp. S
,, (,,) *translucida*, n.sp. S
* ,, (*Typhlomangelia*) *fluctuosa*, n.sp. S
* ,, (,,) *fluctuosa*, var. *cariosa*, nov.
* *Pleurotoma* (*Typhlomangelia*) *pyrrha*, n.sp. N
* ,, five species undetermined. T
* ,, three species undetermined. S
Puncturella noachina (Linné), var. *galeata*, Gould. S
,, *noachina* (Linné), var. ,, *princeps*, Mighels.
* ,, n.sp. (?). T
* *Purpura* (*Cronia*) *amygdala*, Kiener. S T
* ,, (*Polytropa*) *scobina*, Quoy and Gaimard, var. *albomarginata*, Deshayes. S
* ,, (*Stramonita*) *fasciata*, Reeve. T
* ,, (*Thalessa*) *alveolata*, Reeve. N
* ,, (,,) *pica*, Blainville. T
* *Pyramidella nodicincta*, Adams. T
* *Pyrgula* (?) sp. S
* *Pyrula morio* (Linné). T
* ,, *ternatana* (Gmelin). T
* *Ranella margaritula*, Deshayes. T
* ,, *rana* (Linné). T
,, (*Argobuccinum*) *argus* (Gmelin). S
* ,, (,,) *leucostoma*, Lamarck. S
* ,, (,,) *pusilla*, Broderip. T
* ,, (*Aspa*) *marginata* (Gmelin). N
* ,, (*Eupleura*) *perca* (Perry). T
* ,, (*Lampas*) *granifera*, Lamarck. T
* ,, (,,) *thomæ*, d'Orbigny. N
* *Rapana bulbosa*, Solander. T
* *Ringicula assularum*, n.sp. T

* *Ringicula doliaris*, Gould. S
* ,, *pusilla*, n.sp. T
* ,, sp. (?). T
* *Rissoa costulata*, Alder. N
* ,, *similis*, Seaechi. N
* ,, (*Alvania*) *canariensis*, d'Orbigny. N
* ,, (,,) *costata* (Adams). N
* ,, (,,) *leacocki*, Watson. N
* ,, (,,) *trajectûs*, n.sp. T
* ,, (*Cingula*) *glabrata* (Mühlfeldt). N
* ,, (,,) *scopulorum*, n.sp. T
* ,, (*Onoba*) *fenestrata*, Krauss. S
* ,, (,,) *mercurialis*, n.sp. T
* ,, (,,) *striata* (Adams). N
* ,, (,,) *watsoni*, Sehwartz. N
* ,, (*Scrobs*) *badia*, n.sp. S
* ,, (,,) *scrobiculator*, n.sp. S
* ,, (*Setia*) *albugo*, Watson. N
* ,, (,,) *australis*, n.sp. S
* ,, (,,) *callosa*, Manzoni. N
,, (,,) *principis*, n.sp. S
* ,, (,,) *sinapi*, n.sp. S
* ,, fourteen speeies undetermined. T
* ,, three speeies undetermined. S
* *Rissoina cincta*, Angas. S
* ,, *ephamilla* [*scalariformis*], n.sp. T
* ,, *honoluluensis*, n.sp. T
* ,, *mercurialis*, n.sp. T
* ,, *miranda* (Adams). T
* ,, *reticulata* (Sowerby). T
* ,, *transenna*, n.sp. T
* ,, *triangularis*, n.sp. T
* ,, *triticea*, Pease. T
* ,, sp. (?). T
Rotella (?) sp. N
* *Scalaria aculeata*, Sowerby. S
* ,, *jukesiana*, Forbes. S
* ,, (*Acirsa*)*subdecussata*, Cantraine. N
* ,, (*Cirsostrema*) *dentiscalpium*, n.sp. T
* ,, (,,) *hellenica*, Forbes. T
* ,, two speeies undetermined. T
Scaliola arenosa, Adams. T
,, *bella*, Adams. T
* ,, *caledonica*, Crosse. T
Schismope carinata, n.sp. S T
Scissurella alta, n.sp. N T
* ,, *coronata*, n.sp. T
* ,, *obliqua*, n.sp. S
* ,, two speeies undetermined. T
* ,, sp. (?). S
* *Separatista chemnitzii*, Adams. T
* *Siphodentalium dichelum*, n.sp. T
* ,, *eboracense*, n.sp. T
* ,, *honoluluense*, n.sp. T
* ,, *tetraschistum*, n.sp. T
* *Siphonaria cancer*, Reeve. S
* ,, (*Liriola*) *tristensis*, Leach. S
* *Skenea subcanaliculata*, Smith. S
* ,, (?), four speeies undetermined. T
,, sp. (?). S
* *Solarium* (*Architectonica*) *perspectivum* (Linné). T
* ,, (,,) *reevei*, Hanley. S
* ,, (*Torinia*) *rosulentum*, n.sp. S
* ,, sp. (?). T
* *Stomatella imbricata*, Lamarek. S
* ,, (*Gena*) *nigra*, Quoy and Gaimard. S T
* *Strebloceras subannulatum*, n.sp. T

* *Strombus lentiginosus*, Linné. S
* ,, (*Canarium*) *gibberulus*, Linné. T
* ,, (,,) *muricatus*, Martini. T
* ,, (,,) *rugosus*, Sowerby. T
* ,, (,,) *rupellii*, Reeve. T
* ,, (*Gallinula*) *campbellii*, Gray. T
* ,, (,,) *canarium*, Linné. T
* ,, (,,) *columba*, Lamarck. T
* ,, (,,) *succinctus*, Linné. T
* ,, (,,) *variabilis*, Swainson. T
* ,, (,,) *vittatus*, Linné. T
* ,, sp. (?). T
* *Struthiolaria mirabilis*, Smith. S
* ,, *scutulata* (Martyn). S
* *Stylifer crotaphis*, n.sp. S
* *Terebellum punctatum*, Chemnitz. T
* *Terebra albomarginata*, Deshayes. T
* ,, *bathyraphe*, Smith. N
* ,, *conspersa* (Hinds). T
* ,, *maculata* (Linné). T
* ,, *muscaria*, Lamarck. T
* ,, *polygyrata*, Deshayes. T
* ,, *straminea*, Gray. T
* ,, *triseriata*, Gray. T
* ,, (*Myurella*) *amæna*, Deshayes. T
* ,, (,,) *babylonia*, Lamarck. T
* ,, (,,) *bicolor* (Angas). S
* ,, (,,) *cælata*, Adams and Reeve. T
* ,, (,,) *turrita*, Smith. T
* *Terebra* (*Myurella*) *undulata*, Gray. T
* ,, two species undetermined. T
* *Trachysma* (?) sp. T
* *Triforis dolicha*, n.sp. T
* ,, *levukensis*, n.sp. T
,, *perversa* (Linne). T N
* ,, *rufula*, n.sp. T
* ,, eleven species undetermined. T
* ,, three ,, ,, S
* *Triton nodifer*, Lamarck. T
* ,, *subdistortus*, Lamarck. S
* ,, (*Cabestana*) *spengleri* (Chemnitz). S
* ,, (*Cymatium*) *tuberosus*, Lamarck. T
* ,, (*Distorsio*) *cancellinus* (De Roissy). T
* ,, (*Epidromus*) sp. (?). S
* ,, (*Gutturnium*) *elongatus*, Reeve. T
* ,, (,,) *gracilis*, Reeve. T
,, (*Lagena*) *magellanicus* (Chemnitz). S
* ,, (*Simpulum*) *costatus* (Born). S
* *Trochus niloticus*, Linné. T
* ,, (*Bankivia*) *fasciatus* (Menke). S
* ,, (*Chlorostoma*) *ater*, Lesson. S
* ,, (,,) *xanthostigma* (Adams). N
* ,, (*Chrysostoma*) *paradoxus*, Born. T
* ,, (*Clanculus*) *clangulus*, Wood. S
* ,, (,,) *floridus*, Philippi. S
* ,, (,,) *homalomphalus*, Adams. S
* ,, (,,) *maugeri*, Wood. S
* ,, (*Diloma*) *porcifer* (Adams). S
* ,, (*Elenchus*) *badius*, Wood. S
* ,, (*Euchelus*) *atratus* (Gmelin). T
* ,, (,,) *baccatus* (Menke). S
* ,, (,,) *dunkeri*, Koch. S

* *Trochus* (*Gibbula*) *zonatus*, Wood. S
* ,, (,,) sp. (?). T
* ,, (*Leiopyrga*) *picturatus* (Adams). S
,, (*Margarita*) *charopus*, n.sp., var. *cæruleus*, nov. S
* ,, (,,) *illotus*, n.sp. S
* ,, (,,) *pachychiles*, n.sp. T
* ,, (*Monilea*) *belcheri*, Philippi. T
* ,, (,,) *benzi*, Krauss. S
* ,, (*Monodonta*) *labio*, Linné. T N
* ,, (*Photinula*) *cærulescens* (King). S
,, (,,) *expansus* (Sowerby). S
* ,, (,,) *tæniatus* (Sowerby). S
* ,, (*Solariella*) *albugo*, n.sp. S
* ,, (,,) *lamprus*, n.sp. T
* ,, (,,) *philippensis*, n.sp. S
* ,, (,,) *prodictus*, Fischer. S
* ,, (,,) *vitiligineus*, Menke. S T
* ,, (,,) three species undetermined. T
* ,, (*Trochocochlea*) *colubrinus*, Gould. N
* ,, (,,) *fuligineus*, Adams. S
* ,, (*Ziziphinus*) *arruensis*, n.sp. T
* ,, (,,) *decoratus*, Philippi. S
* ,, (,,) *exasperatus*, Pennant. N
* ,, (,,) *similaris*, Reeve. T
* ,, (,,) *stephanephorus*, n.sp. T
,, (,,) *striatus*, Linné. N
* *Trochus* (*Ziziphinus*) *tinctus*, n.sp. S
* ,, (,,) *transenna*, n.sp. T
* ,, (,,) *zizyphinus*, Linne. T
* ,, five species undetermined. S
* *Trophon albolabratus*, Smith. S
,, *declinans*, n.sp. S
* ,, *geversianus* (Pallas). S
,, *liratus*, Couthouy, MS. S
* ,, *septus*, n.sp. S
* *Turbo petholatus*, Linne. T
* ,, *smaragdus* (Martyn). S T
* ,, (*Bolina*) *lapillus*, Reeve. T
* ,, (*Lunella*) *coronatus*, var. *granulatus*, Gmelin. T
* ,, (*Ninella*) *staminea* (Martyn). S
* ,, (*Senectus*) *chrysostomus*, Linne. T
* ,, (*Uvanilla*) *tentoriiformis* (Jonas). S
* ,, sp. (?). T
* *Turritella accisa*, n.sp. S
* ,, *admirabilis*, n.sp. T
* ,, *austrina*, n.sp. S
* ,, *bicingulata*, Lamarck. N
* ,, *carlottæ*, n.sp. S
* ,, *cingulifera*, Sowerby. T
* ,, *cordismei*, n.sp. S
* ,, *fascialis*, Menke. T
* ,, *fastigiata*, Adams and Reeve. T
* ,, *incolor*, n.sp. S
* ,, *knysnaënsis*, Krauss. S
* ,, *lamellosa*, n.sp. S
* ,, *philippensis*, n.sp. S
* ,, *rosea*, Quoy and Gaimard. S
* ,, *runcinata*, n.sp. S
* ,, *sinuata*, Reeve. S
* ,, (*Eglisia*) *tricarinata*, Adams and Reeve. T
* ,, sp. (?). S

* *Typhis philippensis*, n.sp. S
* *Umbrella mediterranea*, Lamarck. T
* *Utriculus amphizostus*, n.sp. T
* ,, *complanatus*, n.sp. T
* ,, *famelicus*, n.sp. T
* ,, *mamillatus* (Philippi). N
* ,, *planospira* (Adams). T
* ,, *simillimus*, n.sp. T
* ,, *tornatus*, n.sp. N
* ,, (*Tornatina*) *acrobeles*, n.sp. T
* ,, (,,) *amboinensis*, n.sp. T
* ,, (,,) *aratus*, n.sp. T
* ,, (,,) *avenarius*, n.sp. S
* ,, (,,) *canaliculatus* (Say). T
* ,, (,,) *voluta* (Quoy and Gaimard). T
* ,, (,,) four species undetermined. T
* ,, four species undetermined. T
* *Vanikoro* (?) sp. T
* *Vermetus* (?) *cyclicus*, n.sp. T
* *Vitularia crenifera* (Montrouzier). T
* *Voluta* (*Alcithoe*) *gracilis*, Swainson. S
* ,, (*Cymbiola*) *ancilla*, Solander. S
* ,, (*Scaphella*) *turneri*, Gray. T
* ,, (,,) *undulata*, Lamarck. S
* ,, (*Vespertilio*) *sophia*, Gray. T
* ,, (,,) *vespertilio*, Linné, var. *pellis serpentis*, Lamarck. T
,, (*Volutilithes*) *abyssicola*, Adams and Reeve. S
* ,, (*Zidona*) *angulata*, Swainson. S
* ,, sp. (?). T
* *Volutomitra fragillima*, n.sp. S
* *Watsonia elegans*, n.g., n.sp. T
Xenophora corrugata (Reeve). T
* *helvacea*, Philippi. T
* ,, *solarioides* (Reeve). T
* New genus (?). S

Polyplacophora :

* *Acanthochiton garnoti* (Blainville). S
* *Acanthopleura* (?) *incana* (Gould). S N
* ,, *spiniger* (Sowerby). T
* *Callistochiton antiquus* (Reeve). S
* *Callochiton platessa* (Gould). S
* *Chiton jugosus*, Gould. S
* ,, *murrayi*, n.sp. S
* ,, *nigrovirescens*, Blainville. S
* ,, *pellis-serpentis*, Quoy and Gaimard. S
* ,, *squamosus*, Linné. N
* *Cryptoplax larvæformis*, Blainville. T
* ,, *oculatus* (Quoy and Gaimard). T
* ,, *striatus* (Lamarck). S
* *Francisia spinosa* (Bruguière). T
* *Hemiarthrum setulosum*, Carpenter, MS. S
* *Ischnochiton boogii*, n.n. T
* ,, *fruticosus* (Gould). S
* ,, *longicymba* (Blainville). S
* ,, *viridulus* (Couthouy). S
* *Lepidoradsia australis* (Sowerby). S
* *Leptochiton kerguelensis*, n.sp. S
* *Lorica volvox* (Reeve). S
* *Plaxiphora carpenteri*, n.sp. S
,, *simplex* (Carpenter, MS.). S
* *Schizochiton incisus* (Sowerby). T

Nudibranchiata :

* *Archidoris australis*, n.sp. S
* ,, *kerguelenensis*, n.sp. S
* *Bornella excepta*, n.sp. N

* *Ceratosoma cornigerum* (Adams). T
* *Chromodoris runcinata*, Bergh. S
* ,, *striatella*, Bergh. T
* *Discodoris morphæa*, Bergh. T
* *Doriopsis nebulosa*, Pease. T
* *Janolus australis*, n.g., n.sp. T
* *Marionia occidentalis*, n.sp. S
* *Ohola pacifica*, n.g., n.sp. T
* *Onchidium melanopneumon*, n.sp. T
* *Platydoris eurychlamys*, Bergh. T
* *Rizzolia australis*, n.sp. S
* *Thordisa* (?) *clandestina*, n.sp. T

MARSENIADÆ :

* *Marsenia dubia*, n.sp. N
* *Marseniopsis murrayi*, n.g., n.sp. S
* ,, *pacifica*, n.g., n.sp. S

CEPHALOPODA :

* *Argonauta argo*, Linné. S
* *Inioteuthis morsei*, Verrill. N
* *Loligo brasiliensis*, Blainville. S
* ,, *edulis*, n.sp. N
* ,, (?) *ellipsura*, n.sp. S
* ,, *galatheæ*, Steenstrup, MS. T
* ,, *indica*, Pfeffer. T
* ,, *japonica*, Steenstrup, MS. N
* ,, *kobiensis*, n.sp. N
* *Octopus australis*, n.sp. S
* ,, *bandensis*, n.sp. T
* ,, *bermudensis*, n.sp. N
,, *boscii* (Lesueur), var. *pallida*, nov. S
* ,, *granulatus*, Lamarck. S T
* ,, *levis*, n.sp. S
* ,, *macropus*, Risso. N
* ,, *marmoratus*, n.sp. T
* ,, *occidentalis*, Steenstrup, MS. T
* *Octopus pictus*, Brock, var. *fasciata*, nov. S
* ,, *tehuelchus*, d'Orbigny. T
* ,, *tonganus*, n.sp. T
* ,, *tuberculatus*, Blainville. T
* ,, *verrucosus*, n.sp. S
* ,, *vitiensis*, n.sp. T
* ,, sp. (?) T
* *Rossia patagonica*, Smith. S
* ,, *sublevis*, Verrill. S
* ,, (?) *tenera* (Verrill). N
* *Sepia andreanoides*, n.sp. N
* ,, *elliptica*, n.sp. T
* ,, *esculenta*, n.sp. N
* ,, *kobiensis*, n.sp. N
* ,, *papuensis*, n.sp. T
* ,, *smithi*, n.sp. T
* ,, (*Metasepia*) *pfefferi*, n.sp. T
* *Sepiella maindroni*, Rochebrune. N
Spirula peronii, Lamarck. T
* *Todarodes pacificus*, Steenstrup. N

POLYZOA :

Adeonella atlantica, n.g., n.sp. S
,, *distoma*, Busk. T N
* ,, *intricaria*, n.g., n.sp. T
* ,, *pectinata*, n.g., n.sp. T
* ,, *platalea*, Busk. T
* ,, *polymorpha*, n.g., n.sp. T
Ætea anguina (Linné). S N
* *Alecto granulata*, M.-Edwards. S
* *Amathia brasiliensis*, n.sp. T
* ,, *connexa*, n.sp. T
* ,, *distans*, n.sp. T
* ,, *lendigera* (Linné). N
* ,, *semispiralis* (Kirchenpauer). T
,, *spiralis*, Lamouroux. S
* *Amphiblestrum capense*, n.sp. S
* ,, *cervicorne*, Busk. S

* *Amphiblestrum cristatum*, n.sp. S
* ,, *imbricatum*, n.sp. S
* ,, *papillatum*, n.sp. T
,, *umbonatum*, Busk. S
* *Bicellaria glabra* (Hincks). T
,, *pectogemma*, Goldstein. S
* *Biflustra savartii* (Audouin). T
* *Bugula longissima*, n.sp. S
* ,, *neritina* (Linné). N
* *Caberea lata*, Busk. T
* ,, *minima*, n.sp. S
* ,, *rudis*, Busk. S
* *Caleschara denticulata*, MacGillivray, var. *tenuis*, nov. S
* *Canda arachnoides*, Lamouroux. S
* *Carbasea cribriformis*, Busk. T
,, *dissimilis*, Busk. S T
* ,, *elegans*, Busk. S
,, *ovoidea*, Busk. S
* ,, *pisciformis*, Busk. S
* *Catenaria attenuata*, n.sp. S
* ,, *diaphana*, Busk. T
* *Catenicella cribraria*, Busk. S
,, *elegans*, Busk. S T
,, *hastata*, Busk. S
,, *plagiostoma*, Busk. S
* ,, *pulchella*, Maplestone. S
* ,, *umbonata*, Busk. S
* *Cellepora albirostris* (Smitt). S
* ,, *apiculata*, n.sp. S
,, *bicornis*, n.sp. S
* ,, *bidenticulata*, n.sp. S
* ,, ,, var. *subæqualis*, nov.
* ,, *bilabiata*, n.sp. S
* ,, *canaliculata*, n.sp N
* ,, *columnaris*, n.sp. S
* ,, *conica*, n.sp. S
* ,, *discoidea*, n.sp. T
Cellepora eatonensis, n.sp. S
* ,, *granum*, Hincks. S
* ,, *hastigera*, n.sp. S
* ,, *honolulensis*, n.sp. T
* ,, *imbellis*, n.sp. T
* ,, *jacksoniensis*, n.sp. S
,, *mamillata*, var. *atlantica*, Busk, S T
* ,, *polymorpha*, n.sp. T
,, *pustulata*, n.sp. S
* ,, *samboangensis*, n.sp. T
* ,, *signata*, n.sp. S
* ,, *simonensis*, n.sp. S
* ,, *tuberculata*, n.sp. S
* ,, *tridenticulata*, n.sp. T
,, *tubulosa* (Hincks). S
,, *vagans*, n.sp. S T
* *Cellularia cuspidata*, Busk. S
* ,, *elongata*, n.sp. S
* ,, *quadrata*, n.sp. S
* *Chlidonia cordieri* (Audouin). T
* *Chorizopora brongniartii* (Audouin). S
* ,, *honolulensis*, n.sp. T
* ,, *hyalina*, var. *bougainvillei*, d'Orbigny. S
* *Cribrilina labiosa*, Busk, var. *fragilis*, nov. S
,, *monoceros* (Busk). S N
* ,, *philomela*, n.sp. S
* ,, ,, var. *adnata*, nov.
,, *radiata* (Moll). S
* *Crisia acropora*, Busk. S
,, *conferta*, Busk. S T
* ,, *denticulata* (Lamarck). S T N
* ,, ,, var. *gracilis*, nov.
* ,, ,, var. *patagonica*, d'Orbigny.

* *Crisia eburnea* (Linné), var. *laxa*, nov. S
* *Cupularia canariensis*, Busk. T
* ,, *guineensis*, Busk. T
* ,, *monotrema*, n.sp. T
* ,, *owenii* (Gray). T
* *Cylindracium papuense*, n.sp. T
* *Diachoris costata*, Busk. S
* ,, *crotali*, Busk. S
* ,, *hirtissima*, Heller. T
* ,, *inermis*, Busk. S
* ,, *magellanica*, Busk. S
* ,, ,, var. *distans*, nov.
* *Emma crystallina*, Gray. S
* *Eschara elegantula*, d'Orbigny. N
* ,, *gracilis*, Lamarck. S T
Escharoides occlusa, n.sp. S T
* ,, *verruculata* (Smitt). S
* *Farrella atlantica*, n.sp. T
* *Flustra crassa*, n.sp. S
* ,, *membraniporides*, n.sp. S
* ,, *separata*, n.sp. N
Flustramorpha hastigera, n.sp. N
,, *marginata* (Krauss). S
Foveolaria elliptica, n.g., n.sp. S
* ,, *tubigera*, n.g., n.sp. S
* *Gemellipora cribritheca*, n.sp. S
* ,, *glabra*, Smitt. T
Haswellia auriculata, n.g., n.sp. S
* ,, *australiensis* (Haswell). T
* *Hippothoa flagellum*, Manzoni. S
* *Hornera foliacea*, MacGillivray. S
* ,, *violacea*, Sars. S
Ichthyaria acuiata, n.g., n.sp. S
Idmonea atlantica, Forbes. S N
* ,, *australis*, MacGillivray. S
* ,, *boracensis*, n.sp. T
,, *marionensis*, Busk. S
,, *milneana*, d'Orbigny. S N
* *Idmonea radians* (Lamarck). T
* *Lepralia celleporoides*, n.sp. T
* ,, *dorsiporosa*, n.sp. T
* ,, *feegeensis*, n.sp. T
* ,, *incisa*, n.sp. S
* ,, *japonica*, n.sp. N
* ,, *lonchæa*, n.sp. T
* ,, *margaritifera* (Quoy and Gaimard). S
* ,, *marsupium*, MacGillivray. S
* ,, *tuberosa*, n.sp. S
* *Lunularia capulus*, Busk. S
Membranipora albida, Hincks. T N
,, *crassimarginata* (Hincks), var. *erecta*, nov. S
* ,, *dumerilii*, Audouin. S
,, *galeata*, Busk. S N
,, ,, var. *furcata*, nov.
,, ,, ,, *multifida*, nov.
Menipea aculeata (d'Orbigny). S
,, *benemunita*, n.sp. S
* ,, *cirrata*, Lamouroux. S
* ,, *flabellum*, Lamouroux. S
,, *flagellifera*, n.sp. S
,, *marionensis*, n.sp. S
* ,, *triseriata*, Busk. S
Micropora coriacea (Esper). S N
* *Microporella coscinopora*, var. *armata*, Waters. S
,, *malusii* (Audouin). S
* ,, *personata* (Busk). T
* *Mucronella bisinuata* (Smitt). T
,, *castanea*, n.sp. T
* ,, *contorta*, Busk. S
* ,, *delicatula*, n.sp. T
* ,, *magnifica*, n.sp. T

* *Mucronella pyriformis*, n.sp. S
* ,, *quadrata*, n.sp. T
* ,, *simplicissima*, n.sp. S
,, *tricuspis*, Hincks. S
,, (*Phylactella* ?) *canalifera*, n.sp. N
* *Myriozoum honolulense*, n.sp. T
,, *marionense*, n.sp. S
Nellia oculata, Busk. S T
Onchopora sinclairii, Busk. S
* *Onchoporella bombycina* (Linné). S
* *Palmicellaria skenei* (Ellis and Solander), var. *tridens*, Kirchenpauer. N
Pustulopora proboscidea, M.-Edwards. S
* ,, *proboscidioides* (Smitt). S
* ,, *regularis*, MacGillivray. S
* *Retepora apiculata*, n.sp. T
,, *atlantica*, n.sp. N
* ,, *columnifera*, n.sp. T
* ,, *contortuplicata*, n.sp. T
* ,, *crassa*, n.sp. S
* ,, *delicatula*, n.sp. T
* ,, *denticulata*, n.sp. T
* ,, *hirsuta*, n.sp. T
* ,, *jacksoniensis*, n.sp. S
* ,, *lata*, n.sp. S
* ,, *mucronata*, n.sp. T
* ,, *philippinensis*, n.sp. T
* ,, *phœnicia*, Busk. S
* ,, *producta*, n.sp. T
* ,, *simplex*, n.sp. T
* ,, *tessellata*, Hincks. S
* ,, ,, var. *cæspitosa*, nov.
,, ,, var. *pubens*, nov.
* ,, *tubulata*, n.sp. T
* ,, *victoriensis*, n.sp. S N
* ,, ,, var. *japonica*, nov.
* *Reteporella flabellata*, n.g., n.sp. S
* *Salicornaria clavata*, n.sp. S
* ,, *gracilis*, Busk. T
* ,, *malvinensis*, Busk. S T
* ,, *simplex*, n.sp. S
* ,, *tenuirostris*, Busk. S
* ,, *variabilis*, n.sp. S
* *Schizoporella cecilii* (Audouin). S
* ,, *circinata* (MacGillivray). S
* ,, *furcata*, n.sp. T
* ,, *jacksoniensis*, n.sp. S
* ,, *longispinata*, n.sp. S
,, *marsupifera*, n.sp. S
* ,, *tenuis*, n.sp. S T
* ,, *triangula*, Hincks. S
* ,, *vitrea* (MacGillivray). S
* ,, *woosteri*, MacGillivray. S
* *Scrupocellaria ciliata* (Audouin). T
,, *macandrei*, Busk. T
* ,, *ornithorhynchus* (Wyville Thomson). T
,, *pilosa* (Audouin). S
* ,, *securifera*, n.sp. T
* *Selenaria maculata*, Busk. S
* *Smittia jacobensis*, n.sp. S T
,, *marionensis*, Busk. S
* ,, *marsupialis*, n.sp. S T
* ,, *stigmatophora*, n.sp. S
* ,, *tenuis*, n.sp. T
* *Steganoporella magnilabris* (Busk). T
* *Supercytis tubigera*, n.sp. S
* *Tubucellaria opuntioides*, Pallas. T
* *Tubulipora fimbria*, Lamarck. S
* ,, *flabellaris* (Fabricius). S
* *Vesicularia papuensis*, n.sp. T
Vincularia gothica, d'Orbigny, var. *granulata*, nov. S

PHORONIS :

* *Phoronis buskii*, n.sp. T

BRACHIOPODA :

* *Argiope decollata* (Chemnitz). N
* *Discina stellata*, Gould. T
* *Kraussina lamarckiana*, Davidson. S
* *Lingula anatina*, Lamarck. T
* *Magasella cumingi* (Davidson). S
,, *flexuosa* (King). S
* *Megerlia sanguinea* (Chemnitz). T
* ,, *truncata* (Linné). N
* *Terebratella dorsata* (Gmelin). S
* *Terebratulina cancellata*, Koch. S
,, *caput serpentis*, Linné, var. *septentrionalis*, Couthouy. S N
* ,, sp. (?). T
* *Waldheimia flavescens*, Val. *apud* Lamarck. S
,, *kerguelenensis*, n.sp. S

TUNICATA :

* *Amaroucium albidum*, n.sp. S
* ,, *complanatum*, n.sp. S
* ,, *globosum*, n.sp. S
* ,, *hepaticum*, n.sp. (locality and depth unknown).
* ,, *irregulare*, n.sp. S
* ,, ,, var. *concinnum*, nov.
* ,, *lævigatum*, n.sp. S
* ,, *nigrum*, n.sp. S
* ,, *pallidulum*, n.sp. S
* ,, *variabile*, n.sp. S
* ,, ,, var. *tenerum*, nov.
* *Aplidium crassum*, n.sp. T
* ,, *despectum*, n.sp. N
* ,, *fumigatum*, n.sp. S T
* ,, *fuscum*, n.sp. S
* ,, *leucophæum*, n.sp. S
* *Ascidia challengeri*, n.sp. S
* ,, *despecta*, n.sp. S
* ,, *falcigera*, n.sp. N
* ,, *meridionalis*, n.sp. S
,, *nigra* (Savigny). S N
* ,, *pyriformis*, n.sp. S
* ,, *translucida*, n.sp. S
* ,, *vasculosa*, n.sp. S
* *Atopogaster aurantiaca*, n.g., n.sp. S
* ,, *elongata*, n.g., n.sp. S
* ,, ,, var. *pallida*, nov.
* ,, *gigantea*, n.g., n.sp. S
* ,, *informis*, n.g., n.sp. (locality and depth unknown).
* *Boltenia elegans*, n.sp. N
* ,, *legumen*, Lesson. S
* ,, *pachydermatina*, n.sp. S
* *Botrylloides nigrum*, n.sp. N
* ,, *perspicuum*, n.sp. T
* ,, ,, var. *rubicundum*, nov.
* ,, *tyreum*, n.sp. T
* *Chorizocormus reticulatus*, n.g., n.sp. S
* *Ciona aspera*, n.sp. N
* ,, *flemingi*, n.sp. N
* ,, *savignyi*, n.sp. N
* *Clavelina enormis*, n.sp. S
* ,, *oblonga*, n.sp. N
* *Colella concreta*, n.g., n.sp. S
* ,, *elongata*, n.g., n.sp. S
* ,, *gaimardi*, n.g., n.sp. S
* ,, *murrayi*, n.g., n.sp., var. *rubida*, nov. S
* ,, *pedunculata* (Quoy and Gaimard). S
* ,, *pulchra*, n.g., n.sp. T
* ,, *quoyi*, n.g., n.sp. S
* ,, *thomsoni*, n.g., n.sp. T

* *Corella japonica*, n.sp. T N
* *Cynthia arenosa*, n.sp. T
* „ *cerebriformis*, n.sp. S
* „ *complanata*, n.sp. S
* „ *fissa*, n.sp. S
* „ *formosa*, n.sp. T
* „ *hispida*, n.sp. S
* „ *irregularis*, n.sp. S
„ *pallida*, Heller. S T
* „ *papietensis*, n.sp. T
* *Cystodytes philippinensis*, n.sp. T
* *Didemnum aurantiacum*, n.sp. S
* „ (?) *inerme*, n.sp. N
* *Diplosoma macdonaldi*, n.sp. T
* *Diplosomoides molle*, n.g., n.sp. T
* *Distaplia vallii*, n.sp. T
* *Ecteinascidia fusca*, n.g., n.sp. T
* „ *turbinata*, n.g., n.sp. N
* *Eugyra kerguelenensis*, n.sp. S
* *Goodsiria coccinea*, Cunningham. S
* „ *pedunculata*, n.sp. S
* „ *placenta*, n.sp. S
* „ „ var. *fusca*, nov.
* *Leptoclinum albidum*, Verrill. S T
* „ „ var. *grande*, nov.
* „ *annectens*, n.sp. T
* „ (?) *jacksoni*, n.sp. S
* „ *japonicum*, n.sp. N
* „ *moseleyi*, n.sp. T
* „ *neglectum*, n.sp. (locality and depth unknown).
* „ *rubicundum*, n.sp. S
„ *speciosum*, n.sp. S T
„ „ var. *asperum*, nov.
* „ *subflavum*, n.sp. S
* „ *tonga*, n.sp. T
* *Microcosmus helleri*, n.sp. T
* *Microcosmus polymorphus*, Heller. S
* „ *propinquus*, n.sp. S
* *Molgula forbesi*, n.sp. S
* „ *gigantea* (Cunningham). S
* „ *gregaria* (Lesson). S
* „ *horrida*, n.sp. S
* *Morchellioides affinis*, n.g., n.sp. S
* *Morchellium giardi*, n.sp. S
* *Pachychlæna gigantea*, n.g., n.sp. S
* „ *obesa*, n.g., n.sp. S
* „ *oblonga*, n.g., n.sp. S
* *Polycarpa bassi*, n.sp. S
* „ *irregularis*, n.sp. T
* „ *longisiphonica*, n.sp. S
* „ *molguloides*, n.sp. S
* „ *pedata*, n.sp. T
* „ *pilella*, n.sp. T
„ *radicata*, n.sp. S
* „ *rigida*, n.sp. S
* „ *sulcata*, n.sp. T
* „ *tinctor* (Quoy and Gaimard). S
* „ *viridis*, n.sp. S
* *Polyclinum depressum*, n.sp. T
* „ *fungosum*, n.sp. S
* „ *incertum*, n.sp. S
* „ *minutum*, n.sp. S
* „ *pyriformis*, n.sp. S
* *Psammaplidium exiguum*, n.g., n.sp. S
* „ *ovatum*, n.g., n.sp. T
* „ *pyriforme*, n.g., n.sp. T
* „ *retiforme*, n.g., n.sp. S
* „ *rude*, n.g., n.sp. (locality and depth unknown).
* „ *spongiforme*, n.g., n.sp. S
* *Sidnyum pallidum*, n.sp. S
* *Styela clava*, n.sp. N
* „ *exigua*, n.sp. S
* „ *gyrosa* (Heller). S
* „ *lactea*, n.sp. S

Styela radicosa, n.sp. S
* *Symplegma viride*, n.g., n.sp. N
* *Synstyela incrustans*, n.sp. S T
* *Tylobranchion speciosum*, n.g., n.sp. S
* ———— (?) *ignotus*, n.sp. (genus doubtful). S
* ———— (?) *pyriformis*, n.sp. (genus doubtful). S

Fishes :

* *Acanthias blainvilli*, Risso. S
* *Acanthurus blochi*, C.V. T
* ,, *gahm*, Forsk. T
* ,, *hepatus*, Linné. T
* ,, *rhombeus*, Kittl. T
* ,, *triostegus*, Linné. T
* ,, (?) sp. T
* *Achilognathus melanogaster*, Bleeker. N
* *Acropoma japonicum*, Günther. T
* ,, *philippinense*, n.sp. T
* *Agonus chiloensis*, Jen. S
* *Agrammus schlegeli*, Günther. N
* *Albula conorhynchus*, Bl. Schn. T
* *Amphisile scutata*, Linné. T
* *Ancylodon atricauda*, n.sp. S
* *Anguilla ancitensis*, Günther. T
* ,, *mauritiana*, Benn. T
* *Antennarius multiocellatus*, C.V. T
* *Aphoristia ornata*, Lac. S
Aphritis gobio, Günther. S
* *Apocryptes polyophthalmus*, Günther. T
* *Apogon arafuræ*, n.sp. T
* ,, *lineatus*, Schleg. N
* ,, *monogramma*, n.sp. T
* ,, *savayensis*, Günther. T
* ,, *septemstriatus*, n.sp. T
* *Argyriosus setipinnis*, Mitch. T
* *Arius commersoni*, Lac. S
* *Arnoglossus aspilus*, Bleeker. T
* *Arnoglossus tenuis*, n.sp. T
* *Atherina laeunosa*, Forst. T
* *Atheriniehthys brevianalis*, n.sp. S
* *Aulopus japonicus*, n.sp. N
* *Balistes aculeatus*, Linné. T
* ,, *buniva*, Lac. T
* ,, *forcipatus*, Gm. T
* ,, *fuscus*, Bl. Schn. T
* ,, *maculatus*, Gm. T
* ,, *stellatus*, Lac. T
* ,, *verrucosus*, Bl. Schn. T
* ,, *vetula*, L. T
* *Barbus afer*, Peters. S
* ,, *maculatus*, C.V. T
* ,, sp. (?). S
* *Bathysebastes albescens*, Steindachner and Döderlein. N
* *Batrachus diemensis*, Les. T
* *Bdellostoma cirrhatum*, Forst. S
* ,, *polytrema*, Girard. S
* *Belone annulata*, C.V. T
* ,, *jonesi*, Goode. N
* ,, *luiroides*, Bleeker. T
* ,, *strongylurus*, Bleeker. T
* ,, *trachura*, C.V. T
* *Blennius sanguinolentus*, Pall. T
* ,, *tasmanianus*, Rich. S
* *Blennophis webbi*, Val. T
* *Brachypleura novæ-zealandiæ*, Günther. T
* *Brama raii*, Bl. N
* *Branchiostoma belcheri*, Gray. T
* ,, *cultellum*, Peters. T
* *Bregmaceros macclellandi*, Thompson. N
* *Cæsio tile*, C.V. T
Callionymus calauropomus, Rich. S T
* ,, *curvicornis*, C.V. T
* ,, *longicaudatus*, Schleg. T
* ,, *lunatus*, Schleg. S N

* *Caranx armatus*, Forsk. T
* ,, *ascensionis*, Forst. T
* ,, *caballus*, Günther. N
* ,, *crumenophthalmus*, Bl. T
* ,, *georgianus*, C.V. S
* ,, *hippos*, Linné. T
* ,, *muroadsi*, Schleg. N
* ,, *speciosus*, Forsk. T
* *Carcharias obscurus*, Les. T
* *Centronotus nebulosus*, Schleg. N
* *Centropogon australis*, White. S
* *Chætodon modestus*, Schleg. N
* ,, *rafflesi*, Benn. T
* ,, *vagabundus*, Linné. T
Champsodon vorax, Günther. T
* *Chanos salmoneus*, Forst. T
* *Chilinus chlorurus*, Bl. T
* ,, *trilobatus*, Lac. T
* *Chilodactylus macropterus*, Forst. S
* ,, *monodactylus*, Carmich. S
* ,, *zonatus*, C.V. T
* *Chilomycterus orbicularis*, Bl. T
* *Chiloscyllium indicum*, Gm. T
* *Chirocentrus dorab*, Forsk. T
* *Chirus hexagrammus*, Pall. N
* *Chænichthys rhinoceratus*, Rich. S
* *Chærops cyanodon*, Rich. T
* ,, *ommopterus*, Rich. T
* *Chorinemus toloo*, C.V. T
* *Chorisochismus dentex*, Pall. S
* *Chrysophrys swinhonis*, Günther. N
* *Cirrhites arcatus*, C.V. T
* *Cirrhitichthys maculatus*, Lac. T
* *Clinus microcirrhis*, C.V. S
* *Clupea moluccensis*, Bleeker. T
* ,, *sagax*, Jen. S
* ,, *tembang*, Bleeker. T
* *Cnidoglanis megastoma*, Rich. S
* ,, *nudiceps*, n.sp. T
* *Conger marginatus*, Val. T N
* *Congrogadus subducens*, Rich. T
* *Congromuræna anago*, Schleg. N
* ,, *megastoma*, n.sp. N
* *Coryphænoides denticulatus*, Rich. S
* *Cymbium niphonium*, C.V. N
* *Cynoglossus interruptus*, n.sp. N
* ,, *kopsi*, Bleeker. T
* ,, *melampetalus*, Rich. T
* ,, *puncticeps*, Rich. T
* *Cyprinus auratus*, Linné. T
* *Dactylopterus orientalis*, C.V. T
* ,, *volitans*, Linné. T
* *Dascyllus albisella*, Gill. T
* *Diagramma pardale*, C.V. T
* ,, *pictum*, Thunb. T
* *Diodon hystrix*, Linné. T
* *Doryichthys brachyurus*, Bleeker. T
* ,, *pleurotænia*, n.sp. T
* *Drepane punctata*, Linné. T
* *Dules marginatus*, C.V. T
* ,, *rupestris*, Lac. T
* *Duymæria flagellifera*, C.V. T
* *Echeneis naucrates*, Linné. T
* *Eleginus maclovinus*, C.V. S
* *Eleotris fusca*, Bl. Schn. T
* ,, *longipinnis*, Benn. T
* ,, *macrolepidota*, Bl. T
* ,, *sinensis*, Lac. T
* *Engraulis japonica*, Houttuyn. N
* ,, *olida*, Günther. S
* *Equula dussumieri*, C.V. T
* ,, *fasciata*, Lac. T
* ,, *nuchalis*, Schleg. N
* *Euctenogobius ophthalmonema* (Bleeker). T
* *Exocoetus simus*, C.V. T
* *Fistularia serrata*, Cuv.
* *Fundulus bermudæ*, Günther. N

* *Galeoides polydactylus*, Vahl. T
* *Genypterus chilensis*, Guich. S
* *Gerres abbreviatus*, Bleeker. T
* ,, *jonesi*, Günther. N
* ,, *lefroyi*, Goode. N
* ,, *macracanthus*, Bleeker. T
* ,, *oyena*, Forsk. T
* *Glyphidodon assimilis*, Günther. T
* ,, *saxatilis*, L. T
* ,, *septemfasciatus*, C.V. T
* ,, *sordidus*, Forsk. T
* ,, *xanthozona*, Bleeker. T
* *Gobius albopunctatus*, C.V. S T
* ,, *brevifilis*, Day. S
* ,, *bynoensis*, Rich. T
* ,, *echinocephalus*, Rüpp. T
* ,, *flavimanus*, Schleg. N
* ,, *genivittatus*, C.V. T
* ,, *hexanema*, Bleeker. N
* ,, *knutteli*, Bleeker. T
* ,, *ornatus*, Rüpp. T
* ,, *phalæna*, C.V. T
* ,, *sandvicensis*, n.sp. T
* ,, *stamineus*, Val. T
* ,, *yokohamæ*, n.sp. N
* ,, sp. (?). T
* *Gomphosus tricolor*, Quoy and Gaimard. T
* *Hæmulon chrysargyreum*, Günther. T
* *Halargyreus johnsoni*, Günther. S
* *Hapalogenys mucronatus*, Eydoux and Souleyet. N
* *Haplochiton zebra*, Jen. S
* *Haplodactylus punctatus*, C.V. S
* *Harpagifer bispinis*, Forst. S
* *Harpodon microchir*, n.sp. N
* *Heliastes flavicauda*, n.sp. T
* *Hemerocates acanthorhynchus*, Forst. S
* *Hemirhamphus commersoni*, Cuv. T
* *Hemirhamphus quoyi*, C.V. T
* ,, *sajori*, Schleg. N
* ,, *vittatus*, Val. T
* *Heniochus macrolepidotus*, Linné. T
* *Hippocampus villosus*, n.sp. T
* *Hippoglossoides dentatus*, Mitch. N
* *Holacanthus cyanotis*, Günther. T
* *Holocentrum longipinne*, C.V. T
* ,, *spiniferum*, Forsk. T
* *Hoplegnathus fasciatus*, Schleg. N
* *Julis ascensionis*, Q. and G. T
* ,, *dorsalis*, Q. and G. T
* ,, *obscura*, n.sp. T
* *Labrichthys bothryocosmus*, Rich. S
* ,, *celidota*, Forst. S
* *Læmonema longifilis*, n.sp. S
* *Læops parviceps*, n.g., n.sp. S T
* *Latilus argentatus*, C.V. N
* ,, *jugularis*, C.V. S
* *Lentipes concolor*, Gill. T
* ,, *seminudus*, n.sp. T
* *Lepadogaster gouani*, Barnev. T
* *Lepidotrigla microptera*, Günther. N
* ,, *phalæna*, C.V. S
* ,, *spiloptera*, n.sp. T
* *Lethrinus hæmatopterus*, Schleg. T
* ,, *moensi*, Bleeker. T
* ,, *nebulosus*, Forsk. T
* ,, *ramak*, Forsk. T
* *Leuciscus hakuensis*, n.sp. N
* *Lichia glauca*, Linné. T
* *Lophius naresi*, n.sp. T
* ,, *setigerus*, Wahl. N
* *Lophonectes gallus*, n.g., n.sp. S
* *Malacichthys griseus*, Döderlein. N
* *Megalops cyprinoides*, Brouss. T
* *Merluccius gayi*, Guich. S
* *Mesoprion annularis*, C.V. T
* ,, *bengalensis*, Bl. T

* *Mesoprion chrysotænia*, Bleeker. T
* „ *chrysurus*, Bl. T
* „ *fulviflamma*, Forsk. T
* „ *marginatus*, C.V. T
* „ *monostigma*, C.V. T
* „ *semicinctus* (Q. and G.). T
* „ *vitta*, Q. and G. T
* *Micropogon ornatus*, n.sp. S
* „ *undulatus*, Linné. S
* *Minous pictus*, n.sp. T
* *Misgurnus anguillicaudatus*, Cant. N
* *Monacanthus convexirostris*, Günther. S
* „ *filicauda*, n.sp. T
* „ *modestus*, n.sp. N
* „ *pardalis*, Rüpp. T
* „ *penicilligerus*, Cuv. T
* „ *scriptus*, Osbeck. T
* „ *septentrionalis*, Günther. N
* „ *setifer*, Benn. T N
* *Mugil cephalus*, Cuv. T
* „ *dobula*, Günther. T
* „ *kelaarti*, Günther. T
* „ *tongæ*, n.sp. T
* „ *waigiensis*, Q. and G. T
* *Muræna flavo-marginata*, Rüpp. T
* „ *moringua*, Cuv. T
* „ *nebulosa*, Ahl. T
* „ *polyuranodon*, Bleeker. T
* „ *porphyrea*, Guich. S
* „ *richardsoni*, Bleeker. T
* „ two species undetermined. T
* *Muræsox cinereus*, Forsk. N
* *Muræsichthys gymnotus*, Bleeker. S
* *Muræsolepis marmoratus*, n.g., n.sp. S
* *Myliobatis aquila*, Linné. N
* *Myriodon waigiensis*, Q. and G. T
* *Myripristis murdjan*, Forsk. T
Myxine australis, Jen. S N
* *Naseus marginatus*, C.V. T
* *Niphon spinosus*, C.V. N
* *Notacanthus sexspinis*, Rich. S
* *Notothenia acuta*, n.sp. S
* „ *cyaneobrancha*, Rich. S
* „ *elegans*, n.sp. S
„ *longipes*, Steindachner. S
* „ *marionensis*, n.sp. S
* „ *squamifrons*, n.sp. S
* *Ophichthys dicellurus*, Rich. S
* „ *maculosus*, Cuv. T
* *Ophiocephalus maculatus*, Lac. T
* „ *vagus*, Peters. T
* *Opisthognathus macrolepis*, Peters. T
* „ *cornutus*, Linné. T
* *Ostracion cubicus*, Linné. T
* *Otolithus guatucupa*, C.V. S
* *Pagrus cardinalis*, Lac. N
* „ *major*, Schleg. N
* *Parophrys cornuta*, Schleg. N
* *Pegasus natans*, Linné. T
* *Pentapus vitta*, Q. and G. T
* *Percalabrax japonicus*, C.V. N
Percis allporti, Günther. S
* „ *colias*, Forst. S
* „ *hexophthalma*, C.V. T
* „ *sexfasciata*, Schleg. N
* *Percophis brasilianus*, Q. and G. S
* *Periophthalmus kölreuteri*, Pall. T
* *Petroscirtes oualanensis*, n.sp. T
* „ sp. (?). T
* *Photichthys argenteus*, Hutton. S
* *Phyllopteryx tæniophorus*, Gray. T
* *Pimelepterus bosci*, Lac. N
* „ *waigiensis*, Q. and G. T
* *Platax orbicularis*, Forsk. T
* *Platycephalus insidiator*, Forsk. T N
* „ *isacanthus*, C.V. T
* „ *japonicus*, Tiles. T
* „ *malabaricus*, C.V. T

* *Platycephalus pristiger*, C.V. T
* ,, *punctatus*. C.V. N
* ,, *rudis*, n.sp. N
* ,, *sculptus*, n.sp. T
* ,, *spinosus*, Schleg. T
* ,, sp. (?). T
* *Platyglossus pœcilopterus*, Schleg. N
* ,, *pyrrhogramma*, Schleg. N
* ,, *trimaculatus*, Q. and G. T
* *Plecoglossus altivelis*, Schleg. N
* *Plectropoma maculatum*, Bl. T
* *Plesiops corallicola*, Bleeker. T
* *Pleuronectes variegatus*, Schleg. N
* ,, *yokohamæ*, n.sp. N
* *Polynemus sexfilis*, C.V. T
* *Polyprion kneri*, Steindaehner. S
* *Pomacanthus para*, Bl. T
* *Pomacentrus scolopsis*, Q. and G. T
* *Porichthys porosus*, C.V. S
* *Priacanthus benmebari*, Schleg. T
* *Prionotus punctatus*, Bl T
* *Prionurus scalprum*, Langsd. N
* *Psammobatis rudis*, Günther. S
* *Psenes anomalus*, Schleg. N
* *Psettus argenteus*, Linné. T
Pseudophycis bachus (Forst). S
* *Pseudorhombus cinnamomeus*, Schleg. T
* ,, *olivaceus*, Schleg. N
* ,, *pentophthalmus*, Günther. N
* ,, *russelli*, Gray. T
* *Pseudoscarus macrorhinus*, Bleeker. T
* ,, *nuchipunctatus*, C.V. T
* *Pterois lunulata*, Schleg. T N
* ,, *zebra*, C.V. T
* *Raja brachyura*, n.sp. S
* ,, *eatoni*, Günther. S
* ,, *microps*, n.sp. S
* ,, *murrayi*, n.sp. S
* *Raja platana*, n.sp. S
* *Rasbora philippina*, n.sp. T
* *Rhomboidichthys angustifrons*, n.sp. T
* ,, *pantherinus*, Rüpp. T
* ,, *pavo*, Bleeker. T
* ,, *podas*, de la Roche. T
* ,, *spilurus*, n.sp. T
* ,, sp. (?) T
* *Rhypticus arenatus*, C.V. T
* ,, *saponaceus*, Bl. Schn. T
* *Salanx microdon*, Bleeker. N
* *Salilota australis*, n.g., n.sp. S
* *Salmo macrostoma*, n.sp. N
* *Sargus argenteus*, C.V. T
* ,, *capensis*, Smith. N
* *Saurida argyrophanes*, Rich. T
* ,, *grandisquamis*, Günther. T
* ,, *tumbil*, Bl. N
* *Saurus intermedius*, Agassiz. T
* ,, *varius*, Lac. T
* *Scarus chrysopterus*, Bl. T
* *Sciæna sina*, C.V. N
* *Scolopsis bilineatus*, Bl. T
* ,, *monogramma*, C.V. T
* ,, *temporalis*, C.V. T
* *Scorpæna cirrhosa*, Thunb. T
,, *cruenta*, Solander. S
* ,, *miostoma*, n.sp. N
* ,, *nuchalis*, Günther. T
* ,, *plumieri*, Bl. T
* ,, *scrofa*, Linné. T
* ,, *thomsoni*, n.sp. S
* ,, *zanzibarensis*, Playfair. T
* *Scyllium chilense*, Guich. S
Sebastes macrochir, n.sp. N
* ,, *marmoratus*, C.V. T
* ,, *nematophthalmus*, Günther. T
* ,, *oblongus*, n.sp. N
,, *percoides*, Rich. S

* *Sebastes ventricosus*, Schleg. N
* *Serranus apua*, Bl. T
* ,, *diacanthus*, C.V. T
* ,, *dispar*, Playfair. T
* ,, *hexagonatus*, Forst. T
* ,, *impetiginosus*, M. and T. T
* ,, *octocinctus*, Schleg. N
* *Sicydium nigrescens*, n.sp. T
* ,, sp. (?). T
* *Sillago ciliata*, C.V. T
* ,, *japonica*, Schleg. N
* ,, *sihama*, Forsk. T
* *Silurus asotus*, Linné. N
* *Solea heterorhina*, Bleeker. T
* ,, *ovata*, Rich. T
* *Sphærodon grandoculis*, Forsk. T
* *Sphyræna vulgaris*, C.V. T
* *Spirobranchus capensis*, C.V. S
* *Stromateus argenteus*, Bl. T
* *Synanceia verrucosa*, Bl. T
* *Synaptura arafurensis*, n.sp. T
* ,, *zebra*, Bl. T
* *Syngnathus superciliaris*, n.sp. S
* *Tetrabrachium ocellatum*, n.g., n.sp. T
* *Tetraroge longispinis*, C.V. T N
* ,, ,, var. *nuda*, nov.
* *Tetrodon honckeni*, Bl. S
* ,, *immaculatus*, Bl. T
* ,, *nigropunctatus*, Bl. T
* ,, *oblongus*, Bl. N
* ,, *pardalis*, Schleg. N
* ,, *patoca*, H.B. T
* ,, *rubripes*, Schleg. N
* *Teuthis concatenata*, C.V. T
* ,, *hexagonata*, Bleeker. T
* ,, *margaritifera*, C.V. T
* ,, *marmorata*, Q. and G. T
* ,, *vermiculata*, C.V. T
* *Therapon candovittatus*, Rich. T
* ,, *oxyrhynchus*, Schleg. T
* ,, *servus*, Linné. T
* ,, *theraps*, C.V. T
* *Thyrsites atum*, Euphrasen. S
* *Thysanopsetta naresi*, n.g., n.sp. S
* *Trachurus trachurus*, Linné. S N
* *Trachynotus ovatus*, Linné. T
* *Trigla picta*, n.sp. S
* *Tripterygium* sp. (?). S
* *Trygon kuhli*, M. and H. T
* ,, *pastinaca*, Linné. T N
* *Trypauchen chinensis*, Steindachner. T
* ,, *vagina*, Bl. T N
* *Umbrina reedi*, n.sp. S
* *Upeneoides bensasi*, Schleg. N
* ,, *vittatus*, Forsk. T
* ,, sp. (?). T
* *Upeneus barberinus*, C.V. T
* ,, *indicus*, Shaw. T
* ,, *trifasciatus*, Lac. T
* *Uranoscopus asper*, Schleg. N
* ,, *fuscomaculatus*, Steindachner. T
,, *kaianus*, n.sp. T
* *Urocampus cœlorhynchus*, Günther. S
* *Xiphochilus quadrimaculatus*, n.sp. T
* *Zanclorhynchus spinifer*, n.g., n.sp. S
* *Zeus japonicus*, C.V. N
* *Zygæna malleus*, Risso. T

CETACEA :

* *Mesoplodon layardi*, Gray. S

GREEN TURTLE :

* *Chelone viridis*, Schneider. T

Notes on the Bathymetrical Distribution.—Of the species in the above list, 654 species (or 15 per cent.) were taken at more than one Station or locality (when taken at more than two Stations the number of times is indicated within brackets after the name), viz.:—

Cacospongia collectrix.
Luffaria variabilis.
Psammopemma densum.
Amphilectus pilosus.
Echinoclathria carteri.
Halichondria panicea.
„ *solida.*
Myxilla mariana.
Pachychalina fibrosa (3).
Petrosia similis.
Rhizochalina fistulosa.
„ *putridosa* (3).
Stylocordyla stipitata (3).
Suberites carnosus.
Tedania digitata.
Tentorium semisuberites.
Anthastra communis.
Azorica pfeifferæ.
Craniella simillima (3).
Disyringa dissimilis.
Myriastra clavosa (3).
Tethya ingalli.
„ *seychellensis.*
Heteropegma nodus gordii.
Leucilla uter.
Leuconia dura.
„ *multiformis.*
Sycon arcticum.
„ *raphanus.*
Ellisella maculata.
Heliopora cærulea.
Calliactis polypus.
Dysactis crassicornis.
Sphenopus arenaceus.
„ *marsupialis.*
Balanophyllia bairdiana.
Flabellum stokesi.
Madracis asperula (3).
Paracyathus de filippii.
Agaricia fragilis.
Euphyllia glabrescens.
Fungia contortifolia.
„ *patella* (3).
„ *paumotensis.*
Fungia repanda (3).
Goniastræa quoyi.
Madrepora parilis.
„ *pocillifera* (3).
„ *rosacea.*
„ *securis.*
Manicina areolata.
Millepora alcicornis.
„ *gonagra* (3).
Montipora levis.
Oculina diffusa.
„ *varicosa.*
Pocillopora acuta (3).
„ *brevicornis.*
„ *cespitosa.*
Porites palmata.
„ *tenuis.*
Rhodaræa tenuidens.
Rhodopsammia parallela.
Seriatopora caliendrum.
„ *cervina.*
Stephanaria stellata.
Stylophora digitata.
„ *palmata.*
Tridacophyllia manicina (3).
Turbinaria crater (3).
Acanthella effusa.
Acanthocladium huxleyi.
Desmoscyphus obliquus.
„ *pectinatus.*
Halecium flexile.
Idia pristis.
Lytocarpus spectabilis.
Obelia geniculata.
Actinometra coppingeri.
„ *fimbriata.*
„ *nobilis.*
„ *parvicirra* (6).
„ *paucicirra* (3).
„ *pectinata.*
„ *solaris.*
Antedon milberti.
„ *variipinna.*
Promachocrinus kerguelenensis.

Acanthaster echinites.
Archaster typicus.
Asterias cunninghami.
,, *glomerata.*
,, *meridionalis.*
,, (*Smilasterias*) *scalprifera.*
,, (*Stolasterias*) *calamaria.*
Asterina exigua (3).
Astropecten brasiliensis.
,, *japonicus* (3).
,, *pectinatus* (3).
,, *polyacanthus* (4).
,, *velitaris.*
Calvasterias stolidota.
Choriaster granulatus.
Craspidaster hesperus.
Cribrella oculata.
,, *simplex.*
Culcita novæ-guineæ.
Gnathaster elongatus.
,, *meridionalis.*
Leptoptychaster kerguelenensis.
Linckia miliaris.
,, *pacifica*, var. *diplax.*
Luidia forficifer.
Pentaceros productus.
,, *turritus* (3).
Perknaster fuscus.
Retaster insignis.
Stellaster incei (4).
Amphiura depressa.
,, *studeri.*
Astrophyton exiguum.
Euryale aspera.
Gorgonocephalus pourtalesii.
Ophiacantha imago.
,, *vivipara* (5).
Ophiactis asperula.
,, *savignyi.*
Ophiocamax vitrea.
Ophiocnida pilosa.
Ophiocoma erinaceus.
,, *scolopendrina* (4).
Ophioglypha deshayesi.
,, *hexactis.*
,, *kinbergi* (4).
,, *lymani.*
,, *sinensis.*
Ophiolepis annulosa.
,, *cincta.*
Ophiomastix caryophyllata.
Ophiomaza cacaotica.
Ophiomyxa australis (4).
,, *flaccida.*
,, *vivipara.*
Ophionereis dubia (3).
,, *reticulata.*
Ophiothrix angulata (3).
,, *exigua.*
,, *longipeda* (6).
,, *propinqua* (3).
,, *purpurea.*
,, *stelligera* (4).
Ophiura cinerea.
Astropyga pulvinata (3).
Brissopsis luzonica.
,, *lyrifera.*
Cidaris tribuloides (3).
Clypeaster humilis.
Diadema setosum (4).
Dorocidaris papillata.
Echinocardium australe.
Echinometra lucunter (5).
,, *subangularis.*
Echinothrix calamaris (3).
,, *turcarum.*
Echinus magellanicus (4).
Eupatagus valenciennesii.
Goniocidaris canaliculata (4).
,, *tubaria.*
Hipponoë variegata (3).
Laganum depressum.
Lovenia elongata (3).
Maretia planulata (3).
Microcyphus zigzag.
Peronella decagonalis (9).
,, *peroni.*
Phyllacanthus annulifera (3).
,, *baculosa.*
Pleurechinus bothyroides.
Salmacis rarispina (3).
Schizaster japonicus (3).
Spatangus purpureus.
Sphærechinus granularis.
Strongylocentrotus dröbachiensis.
Temnopleurus hardwicki.
Toxopneustes pileolus.
Chirodota contorta (4).
Cucumaria crocea (4).
,, *lævigata.*

Cucumaria mirabilis.
„ *serrata.*
Holothuria atra.
„ *impatiens.*
„ *martensii.*
„ *monacaria.*
„ *vagabunda* (3).
Psolus ephippifer (3).
„ *incertus.*
Stichopus chloronotus.
Synapta beselii (3).
„ *distincta.*
Cerebratulus corrugatus.
„ *truncatus* (3).
Drepanophorus serraticollis.
Chlocia flava.
Eunice aphroditois.
„ *ærstedi.*
„ *rittata.*
Eurythoë pacifica.
Hermadion kerguelensis.
Hermodice carunculata (3).
Hyalinœcia tubicola.
Lætmonice producta (4).
Lumbriconereis heteropoda.
Neottis antarctica (4).
Nephthys trissophyllus.
Nereis (*Platynereis*) *eatoni* (4).
Serpula narconensis (3).
Thalenessa oculata.
Myzostoma gigas.
„ *horologium.*
Bairdia amygdaloides (5).
„ *crosskeiana* (3).
„ *foveolata* (5).
Cythere audei.
„ *canaliculata.*
„ *cancellata.*
„ *convoluta.*
„ *crispata* (3).
„ *cymba.*
„ *darwini.*
„ *fungoides.*
„ *goujoni* (3).
„ *kerguelenensis* (5).
„ *obtusalata.*
„ *quadriaculeata.*
„ *rastromarginata.*
„ *reussi* (3).
„ *scabrocuneata* (3).
Cythere scutigera.
„ *tricristata.*
Cytherella cavernosa.
„ *polita.*
„ *semitalis* (4).
Loxoconcha australis.
„ *avellana.*
„ *pumicosa.*
„ *sinensis.*
Macrocypris maculata (5).
„ *orientalis.*
„ *tumida.*
Paracypris polita.
Phlyctenophora zealandica (3).
Pontocypris attenuata.
„ *faba.*
„ *subreniformis.*
Sclerochilus contortus (3).
Xestoleberis curta (4).
„ *granulosa.*
Balanus amaryllis (3).
„ *trigonus.*
Chosroës incisus.
Elasmopus subcarinata.
Liljeborgia consanguinea.
Arcturus furcatus.
Ceratocephalus grayanus.
Serolis pallida.
„ *schythei* (5).
„ *septemcarinata.*
„ *tuberculata.*
Gonodactylus chiragra (3).
Pseudosquilla ciliata.
Squilla nepa (4).
Alpheus avarus (4).
„ *crinitus.*
„ *longimanus.*
„ *minus.*
Arctus immaturus.
Artemesia longinaris.
Bithynis lar (4).
Crangon affinis.
Leptochela robusta.
Nauticaris marionis.
Oodeopus duplex.
Paralpheus diversimanus.
Penæus anchoralis (4).
„ *canaliculatus* (3).
„ *fissurus.*
„ *gracilis.*

Penæus incisipes.
,, *monodon.*
,, *velutinus* (5).
Sicyonia carinata.
Stenopus hispidus.
Anapagurus pusillus (3).
Birgus latro.
Catapagurus australis.
Cœnobita perlata.
,, *rugosa* (5).
Cryptodromia lateralis.
Eupagurus excavatus, var. *meticulosa.*
,, *lacertosus.*
Munida subrugosa (4).
Pagurus calidus.
Petrolisthes validus.
Porcellana serratifrons.
Porcellanella triloba.
Remipes scutellatus.
Spiropagurus spiriger.
Acanthocyclus gayi.
Achæus tenuicollis.
Actæa peronii.
Arcania septemspinosa (3).
Atergatis floridus.
Calappa flammea.
,, *gallus* (4).
,, *hepatica* (3).
Cardiosoma carnifex (3).
Chorilibinia gracilipes.
Ebalia tuberculosa.
,, (*Phlyxia*) *crassipes.*
Egeria arachnoides (3).
Etisus lævimanus.
Eurypodius latreillei (7).
Gelasimus annulipes.
,, *tetragonon.*
,, *vocans.*
Geocarcinus lagostoma.
Grapsus maculatus (5).
Halicarcinus ovatus.
,, *planatus* (3).
Helice latreillei.
Huenia proteus.
Hyas coarctata.
Hyastenus diacanthus.
Hypopeltarium spinosulum (4).
Lambrus (*Aulacolambrus*) *hoplonotus* (3).
,, (*Parthenolambrus*) *massena.*
Leptopodia sagittaria (4).
Leucosia craniolaris (4).
,, *haswelli.*
Macrocœloma concava.
,, *trispinosa.*
Macrophthalmus podophthalmus.
Matuta victrix.
Menæthius monoceros, var. *angusta.*
Metopograpsus messor.
Metoporaphis forficulatus.
Micippa spinosa.
Mithrax forceps (3).
Myra fugax.
Neptunus (*Achelous*) *granulatus.*
,, (,,) *unispinosus.*
,, (*Amphitrite*) *hastatoides* (3).
,, (,,) *rugosus* (3).
,, (*Neptunus*) *sanguinolentus* (3).
Ocypoda arenaria.
,, *ceratophthalma* (5).
Oncinopus aranea.
Pachygrapsus transversus (3).
Picroceroides tubularis.
Pilumnoplax vestita, var. *sexdentata.*
Pilumnus floridanus.
,, *pulcher.*
,, *tomentosus.*
Pisa (*Arctopsis*) *tribulus.*
Podochela riisei.
Portunus corrugatus (4).
Sesarma (*Holometopus*) *aubryi* (3).
Thalamita admete.
,, *prymna* (3).
,, *sima* (3).
,, *stimpsoni.*
Trapezia cymodoce.
,, *rufopunctata.*
Varuna litterata (3).
Xanthodes melanodactylus (3).
Colossendeis megalonyx.
Phoxichilidium patagonicum.
Amussium pleuronectes.
Arca imbricata.
,, (*Barbatia*) *lima.*
,, (*Scapharca*) *clathrata.*
Cardita calyculata.
Carditella torresi.
Cardium (*Bucardium*) *australe.*
,, (,,) *multispinosum.*
,, (,,) *pulchellum* (3).
,, (,,) *tenuicostatum.*

Circe jucunda.
„ *scripta.*
„ *sulcata.*
Corbula modesta.
„ *monilis* (3).
Crassatella rhomboides.
Cytherea (*Caryatis*) *regularis.*
„ (*Dione*) *philippinarum* (3).
Diplodonta conspicua (4).
„ *corpulenta.*
„ *subglobosa.*
Donax nitidus.
Dosinia histrio (3).
Ervilia bisculpta.
Gastrochæna dubia.
Kellia rotunda.
Lima multicostata.
„ *squamosa.*
„ (*Limatula*) *bullata.*
Limopsis cancellata.
Modiolarca trapezina (3).
Myochama anomioides.
Mytilus edulis (3).
„ *magellanicus* (3).
Nucula obliqua.
Pecten corallinoides.
„ *patagonicus.*
„ *senatorius.*
Pectunculus striatularis.
Perna samoensis.
Petricola lapicida.
Plicatula ramosa.
Saxicava arctica (3).
Tapes (*Paratapes*) *undulata.*
Tellina (*Angulus*) *lux.*
„ („) *rhomboides.*
„ (———?) *semen* (3).
Trigonia uniophora (3).
Venus (*Chione*) *caloplylla* (3).
„ („) *foliacea* (3).
„ („) *infans.*
„ („) *striatissima.*
„ (*Ventricola*) *casina.*
Actæon flammeus (3).
Alaba (*Styliferina*) *fulva.*
„ („) *yoniochila* (4).
„ („) *striata.*
Atys hyalina (3).
„ (*Dinia*) *dentifera.*
Barleeia imbricata (3).
Bittium perparvulum (4).
Bulla australis.
Cæcum sepimentum (3).
Calyptræa calyptræformis.
Cancellaria (*Admete*) *specularis.*
Capulus (*Amalthina*) *tricarinatus* (3).
Cassis (*Semicassis*) *pila* (3).
Cerithium balteatum.
„ *dubium* (3).
„ (*Verlagus*) *articulatum.*
„ („) *asperum.*
„ („) *kochi.*
Columbella mercatoria.
„ *rustica.*
„ (*Zafra*) *troglodytes* (3).
Conus (*Leptoconus*) *lizardensis.*
„ (*Lithoconus*) *eburneus.*
Crepidula aculeata.
Cylichna cuticulifera.
„ *reticulata.*
„ (*Volvula*) *sulcata.*
Cypræa spurca.
„ (*Trivia*) *candidula.*
Dentalium dentalis.
„ *javanum* (3).
Eburna (*Zemira*) *australis.*
Eulima martinii.
Fusus (*Eulhria*) *fuscatus* (3).
Marginella (*Persicula*) *ovulum.*
Mitra (*Cancilla*) *interlirata* (3).
„ (*Costellaria*) *amanda.*
„ („) *sculptilis.*
Mucronalia xanthias (3).
Murex (*Chicoreus*) *cervicornis* (3)
„ (*Phyllonotus*) *endivia.*
„ („) *zelandicus.*
Nassa (*Niotha*) *pauperata* (3).
„ („) *stigmaria.*
„ (*Zeuxis*) *algida.*
„ („) *crenulata* (3).
Nassaria sinensis.
Natica effossa.
„ (*Mamma*) *porcellana.*
Neobuccinum eatoni.
„ *vestitum.*
Odostomia kymalodes.
„ *scopulorum.*
„ (*Parthenia*) *casta.*
„ (*Turbonilla*) *dipsycha.*
Oliva (*Galeola*) *picta* (3).

Oliva (*Ispidula*) *australis*.
Patella kerguelensis.
Philine aperta.
Phos roseatus (3).
Pleurotoma marmorata (3).
,, (*Surcula*) *tuberculata*.
,, (*Typhlomangelia*) *fluctuosa*.
Puncturella noachina (3).
,, sp. (?) (4).
Purpura (*Cronia*) *amygdala*.
Ranella margaritula.
,, *rana* (5).
,, (*Argobuccinum*) *pusilla* (3).
Ringicula pusilla (3).
Rissoa (*Alvania*) *trajectûs* (5).
Rissoina reticulata.
,, *triangularis* (3).
Scaliola arenosa (4).
,, *bella* (5).
,, *caledonica* (5).
Stomatella (*Gena*) *nigra*.
Strombus (*Canarium*) *gibberulus*.
,, (*Gallinula*) *campbellii* (3).
,, (,,) *columba*.
,, (,,) *vittatus*.
Struthiolaria mirabilis.
Terebellum punctatum.
Terebra (*Myurella*) *undulata*.
Triton (*Lagena*) *magellanicus*.
Trochus (*Chrysostoma*) *paradoxus*.
,, (*Euchelus*) *atratus* (3).
,, (*Monodonta*) *labio*.
,, (*Photinula*) *expansus*.
,, (*Solariella*) *vitiligineus*.
Turbo smaragdus.
,, (*Senectus*) *chrysostomus* (3).
Turritella austrina.
,, *carlottæ*.
,, *cingulifera* (4).
,, *fascialis*.
,, *fastigiata*.
Utriculus amphizostus (3).
,, *planospira*.
,, *simillimus* (3).
Vermetus cyclicus.
Xenophora solarioïdes (3).
Acanthopleura incana.
Platydoris eurychlamys.
Loligo indica.
,, *kobiensis*.
Octopus granulatus.
Sepia elliptica.
Ætea anguina (5).
Amathia spiralis.
Bugula longissima.
Caberea lata.
Carbasea cribriformis (3).
,, *dissimilis*.
,, *elegans*.
,, *ovoidea*.
Catenicella hastata.
Cellepora bicornis (3).
,, *bidenticulata*.
Cellularia quadrata.
Chorizopora hyalina (3).
Cribrilina monoceros (4).
,, *philomela*.
Crisia denticulata (5).
Diachoris magellanica (3).
Eschara gracilis.
Escharoides occlusa.
Flustra membraniporides.
Haswellia australiensis.
Hornera foliacea.
Idmonea atlantica (3).
,, *australis*.
,, *radians*.
Membranipora crassimarginata.
,, *galeata* (3).
Menipea aculeata.
,, *benemunita* (3).
,, *flagellifera* (3).
Mucronella pyriformis.
,, *tricuspis* (3).
Nellia oculata (5).
Onchopora sinclairii.
Retepora crassa.
,, *producta*.
,, *simplex*.
,, *victoriensis* (3).
Salicornaria clavata (6).
,, *malvinensis* (6).
,, *variabilis* (3).
Schizoporella tenuis.
,, *triangula*.
Smittia marsupialis.
Magasella flexuosa.
Terebratulina caput-serpentis.
Aplidium fumigatum.
Atopogaster elongata.

Boltenia legumen (3).
Colella pedunculata (5).
Corella japonica (3).
Cynthia pallida.
Goodsiria coccinea (3).
Leptoclinum albidum (3).
Synstyela incrustans.
Acanthurus blochi (3).
Anguilla mauritiana (3).
Apogon lineatus.
Balistes buniva.
Bdellostoma cirrhatum.
Belone annulata.
Brachypleura novæ-zealandiæ.
Callionymus curvicornis.
„ *lunatus.*
Caranx ascensionis.
„ *crumenophthalmus* (3).
„ *speciosus.*
Carcharias obscurus.
Conger marginatus.
Cyprinus auratus.
Dules marginatus (3).
Echeneis naucrates.
Eleotris fusca (3).
„ *macrolepidota.*
Equula fasciata.
Gerres oyena.
Glyphidodon saxatilis.
Gobius albopunctatus.
Haplochiton zebra (3).
Hemirhamphus commersoni.
Holocentrum longipinne.
Lethrinus nebulosus.
Lichia glauca.
Lophonectes gallus.
Megalops cyprinoides.
Merluccius gayi.
Mesoprion fulviflamma.
Monacanthus setifer.
Muræna nebulosa.
„ *richardsoni.*
Myxine australis.
Notothenia longipes.
Ostracion cornutus.
Platax orbicularis.
Platycephalus insidiator (4).
„ sp. (?).
Pseudorhombus russelli.
Pseudoscarus nuchipunctatus.
Pterois lunulata.
Raja brachyura.
Rhomboidichthys spilurus.
Salilota australis (3).
Sebastes percoides.
Serranus diacanthus (3)
Solea ovata.
Sphærodon grandoculis.
Tetraroge longispinis.
Tetrodon immaculatus.
Therapon servus.
Trachurus trachurus.
Trygon pastinaca.
Trypauchen vagina (3).
Zygæna malleus.
Mesoplodon layardi.

The majority of these were taken at two Stations, while 127 species were taken at three Stations, 34 species at four Stations, 19 species at five Stations, 4 species at six Stations, 1 species at seven Stations, and 1 species at nine Stations.

Of the 350 species taken in this zone less than 100 fathoms, as well as in deeper zones (those without asterisks),

285 species (or 81 per cent.) were taken in the zone between 100 and 500 fathoms.
49 „ (or 14 per cent.) „ „ „ „ „ 500 and 1000 „
32 „ (or 9 per cent.) „ „ „ „ „ 1000 and 1500 „
14 „ (or 4 per cent.) „ „ „ „ „ 1500 and 2000 „
7 „ (or 2 per cent.) „ „ „ „ „ 2000 and 2500 „
5 „ (or 1 per cent.) „ „ „ „ beyond 2500 fathoms.

Lists of these have been given in the deeper zones (see pages 1282, 1290, 1301, 1313–1314, 1327, 1357–1360).

Of the 3900 species taken only in this zone less than 100 fathoms, 1384 species (or 35 per cent.) are new to science, and the following 82 new genera were taken only in this zone [1]:—

Dendropsis.
Proteleia.
Sideroderma.
Thrinacophora (2).
Amphius.
Cinachyra.
Psammastra.
Scolopes.
Stryphnus.
Anamixilla.
Heteropegma.
Pericharax.
Acanthoisis.
Calypterinus.
Elasmogorgia.
Paranephthya.
Placogorgia.
Platycaulos.
Scleronephthya.
Pteropathes.
Ilyanthopsis.
Stephanidium.
Neohelia.
Sphenophyllia.
Cylloseris.
Domoseris (3).
Moseleya.
Napopora.
Sandalolitha.
Tichopora.
Tichoseris.
Azygoplon.
Calamphora.
Dictyocladium.
Diplocheilus.
Diplocyathus.
Heteroplon.
Schizotricha (2).
Sciurella.
Thecocladium.
Pegantha.
Polycolpa.
Peribolaster.
Rhipidaster.
Ophiobyrsa.
Eupholoë.
Salvatoria.
Phlyctenophora.
Acontiostoma (4).
Cardenio.
Chosroës.
Dryopoides.
Harpinioides.
Platyischnopus.
Protellopsis.
Socarnoides.
Sophrosyne.
Paranebalia.
Artemesia.
Brachycarpus (2).
Cheirothrix.
Scallasis.
Synalpheus.
Latreillopsis.
Picroceroides.
Discoarachne.
Hannonia.
Watsonia.
Janolus.
Ohola.
Atopogaster (4).
Chorizocormus.
Morchellioides.
Pachychlæna (3).
Symplegma.
Tylobranchion.
Lophonectes.
Murœnolepis.
Salilota.
Tetrabrachium.
Thysanopsetta.
Zanclorhynchus.

The great majority of these genera are represented by a single species, while there are 3 with two species, 2 with three species, and 2 with four species.

Notes on the Geographical Distribution.—Of the 4250 species enumerated in the above list, 1472 species (or 35 per cent.) were taken south of the southern tropic, 2392 species (or 56 per cent.) were taken within the tropics, and 571 species (or 13 per cent.) were taken north of the northern tropic; while 26 species (or 0·6 per cent.) were found to be common to all those three areas, 31 species (or 0·7 per cent.) were common to the southern and northern areas, 94 species (or 2 per cent.) were common to the southern and tropical areas, and 88 species (or 2 per cent.) were common to the tropical and northern areas. In addition, there are eleven species, the habitats of which are unknown.

The bathymetrical and geographical information in the foregoing lists is presented in tabular form on page 1430, excluding the Medusæ and Siphonophoræ and other species possibly captured in the intermediate or surface waters, so that these numbers are believed to include only benthonic species.

[1] The number of species is indicated in parentheses for those genera containing more than one species.

TABLE I.

Showing the Bathymetrical Distribution of the Bottom-living Species (Benthos) taken by the Trawl and Dredge on board H.M.S. Challenger.

Zone.	Number of Stations.	Number of Specimens.	Number of Species.	Number of Genera.	Number of Species believed to have come from the Bottom.	Number of Genera believed to have come from the Bottom.	Number of New Species from the Bottom.	Number of New Genera from the Bottom.	Number of Species taken only in the Zone referred to.	Number of New Species taken only in the Zone referred to.	Number of Species taken also in other Zones.	Number of Species taken also in the Zone of over 2500 fathoms.	Number of Species taken also in the Zone between 2000 and 2500 fathoms.	Number of Species taken also in the Zone between 1500 and 2000 fathoms.	Number of Species taken also in the Zone between 1000 and 1500 fathoms.	Number of Species taken also in the Zone between 500 and 1000 fathoms.	Number of Species taken also in the Zone between 100 and 500 fathoms.	Number of Species taken also in the Zone under 100 fathoms.
Over 2500 fathoms	25	600	235	200	153	119	137	49	95	84	58	...	26	33	21	13	10	5
2000 to 2500 fathoms	32	820	340	250	247	172	229	76	161	150	86	26	...	46	38	14	20	7
1500 to 2000 fathoms	32	1250	500	345	394	256	335	96	242	206	152	33	46	...	78	24	48	14
1000 to 1500 fathoms	25	2000	600	400	493	313	358	79	270	201	223	21	38	78	...	69	99	32
500 to 1000 fathoms	23	2000	710	425	616	352	493	92	400	348	216	13	14	24	69	...	143	49
100 to 500 fathoms	40	6000	2050	865	1887	771	1293	166	1407	1024	480	10	20	48	99	143	...	285
Under 100 fathoms	70	...	4400	1500	4248	1438	1525	130	3898	1382	350	5	7	14	32	49	285	...

TABLE II.

Showing the Geographical Distribution of the Bottom-living Species (Benthos) taken by the Trawl and Dredge on board H.M.S. Challenger.

Zone.	Total Number of Bottom-living Species.	Number of Species taken S.	Number of Species taken T.	Number of Species taken N.	Number of Species common STN.	Number of Species common SN.	Number of Species common ST.	Number of Species common TN.
Over 2500 fathoms	153	85 56 %	55 36 %	72 47 %	14 9 %	8 5 %	5 3 %	6 4 %
2000 to 2500 fathoms	247	129 52 %	120 49 %	98 40 %	19 9 %	9 4 %	20 8 %	13 5 %
1500 to 2000 fathoms	394	269 68 %	99 25 %	137 37 %	26 7 %	15 4 %	10 3 %	19 5 %
1000 to 1500 fathoms	493	227 46 %	194 39 %	263 53 %	34 7 %	28 6 %	26 5 %	48 10 %
500 to 1000 fathoms	616	353 57 %	281 45 %	161 26 %	25 4 %	22 4 %	57 9 %	30 5 %
100 to 500 fathoms	1887	824 43 %	952 50 %	359 19 %	37 2 %	33 2 %	76 4 %	73 4 %
Under 100 fathoms	4248	1472 35 %	2390 56 %	571 13 %	26 0·6 %	31 0·7 %	94 2 %	88 2 %

The following species have been inadvertently omitted from the foregoing bathymetrical lists, and are therefore not included in the figures in these tables:—*Holopsamma argillaceum, Hyalonema (Stylocalyx) elegans, Siphonogorgia godeffroyi, Freyella remex, Peniagone challengeri, Peniagone naresi, Scotoplanes insignis, Stichopus challengeri, Bythocythere arenacea, Bythocythere orientalis, Bythocythere velifera, Cythere fortificata, Cythere lactea, Cytherella cingulata, Loxoconcha africana, Polycope favus, Xestoleberis intermedia, Ischnosoma bacillus, Actæon (Buccinulus) cinereus, Pustulopora deflexa, Bathydraco antarcticus, Fistularia depressa, Ostracion cornutus, Polyprnus spinosus, Scopelus engraulis.*

GENERAL OBSERVATIONS ON THE DISTRIBUTION OF MARINE ORGANISMS.

The Challenger observations seem to prove conclusively that life is distributed all over the floor of the ocean. At the very greatest depths no dredgings or trawlings have as yet been taken, but in the muds or clays brought up in the sounding tubes from these great deeps there were remains of Foraminifera and Sponges which apparently lived at these depths. It may be interesting here to recall a few of the results obtained in single hauls of the trawl or dredge at some of the deep-water stations, where the operations were regarded as successful. Without taking into consideration the Protozoa, we find that :—

Distribution of Life all over the Floor of the Ocean.

In 3125 fathoms (Station 253), on Red Clay with dredge, 20 specimens belonging to 10 species were obtained.

In 2900 fathoms (Station 244), on Red Clay with trawl, 70 specimens belonging to 32 species were obtained.

In 2600 fathoms (Station 160), on Red Clay with trawl, 50 specimens belonging to 30 species were obtained.

In 2300 fathoms (Station 241), on Red Clay with trawl, 100 specimens belonging to 35 species were obtained.

In 1950 fathoms (Station 157), on Diatom Ooze with trawl, 150 specimens belonging to 79 species were obtained.

In 1850 fathoms (Station 106), on Globigerina Ooze with trawl, 100 specimens belonging to 38 species were obtained.

In 1600 fathoms (Station 147), on Diatom Ooze with trawl, 200 specimens belonging to 89 species were obtained.

In 1375 fathoms (Station 300), on Globigerina Ooze with trawl, 200 specimens belonging to 52 species were obtained.

In 1100 fathoms (Station 168), on Blue Mud with trawl, 150 specimens belonging to 44 species were obtained.

In 700 fathoms (Station 169), on Blue Mud with trawl, 120 specimens belonging to 70 species were obtained.

In 600 fathoms (Station 320), on Blue Mud with trawl, 500 specimens belonging to 127 species were obtained.

In this enumeration a few of the Molluscs may have been described from their dead shells, but otherwise all the organisms referred to were alive on or near the floor of the ocean at the time of capture. These results clearly indicate a great abundance of life at all depths and on all the different varieties of deep-sea deposits.

Number of Individuals of one Species in Deep-Sea Trawlings.

There were over thirty specimens of the little sea-urchin, *Urechinus naresianus*, in the trawl at Station 146 in 1375 fathoms, but as a rule, in the Challenger trawlings deeper than 1000 fathoms, it was unusual to take more than four or five specimens of any one species in a single haul. Indeed, a great number of genera as well as species, in proportion to the number of specimens, is the marked peculiarity of these hauls in very deep water. In depths less than 1000 fathoms, and especially in depths less than 500 fathoms, immense numbers of individuals, all belonging to the same species, may be captured in a single haul. At Station 166, in 275 fathoms, the specimens of *Pandalus magnoculus* were so very numerous that they were served on the ward-room table. In 555 fathoms in the Faroe Channel over four hundred specimens of *Lætmogone violacea* were procured in a single haul. The only other known specimens of this species were captured by the Challenger at the very antipodes in 410 fathoms off the east coast of Australia. In the Faroe Channel the "Triton" also captured in a single haul of the trawl, from a depth of 540 fathoms, over one thousand specimens of Pycnogonids, chiefly belonging to one species of *Nymphon*. Similar instances might be mentioned in which large numbers of *Rossella*, *Euplectella*, and other organisms, all belonging to one species, were taken in single hauls in depths between 100 and 300 fathoms.

Comparison of Deep-Sea and Shallow-Water Hauls with the Trawl.

It is interesting to compare single hauls made in the deep sea and in shallow water with respect to the number of different species obtained. For instance, at Station 146 in the Southern Ocean, at a depth of 1375 fathoms, the 200 specimens captured belonged to 59 genera and 78 species. The trawl made use of had only a 10-feet beam. In working at such a depth it is not possible to say how long or for what distance the trawl had been dragged over the bottom,—two hours, and a distance of two miles, would probably be an excessive estimate. In depths less than 50 fathoms, on the other hand, I cannot find in all my experiments any record of such a variety of organisms in any single haul, even when using much larger trawls and dragging over much greater distances. The statistics of the Scottish Fishery Board's trawlings in the North Sea, with a 25-feet beam in depths less than 80 fathoms, show the average catch per haul of many trawlings to be 7·3 species for invertebrates and 8·3 species for fishes, the greatest number of both invertebrates and fishes recorded in any one haul being 29 species.[1] My own trawlings off the west coast of Scotland, in depths between 40 and 100 fathoms on muddy bottoms, gave usually a much greater number of species per haul than this, sometimes as many as 50 species, still not such a great variety of animals as was procured in many instances by the Challenger's small trawl in great depths.

The great abundance of both individuals and species in deep water, and the peculiar adaptations among deep-sea animals to the conditions of their existence, all point to the

[1] I am indebted to Dr Fulton of the Scottish Fishery Board for these particulars.

struggle for food not being less severe in the deeper regions of the ocean basins than elsewhere. The great majority of deep-sea species live by eating the surface layers of the mud, clay or ooze, and by catching or picking up the small organisms and minute particles of organic matter which fall from the surface. Many of these species are of gigantic size when compared with their shallow-water allies, and in turn they become the prey of numerous rapacious animals armed with peculiar tactile, prehensile and alluring organs. Phosphorescent light plays an important role in the economy of deep-sea life, and is correlated with the prevailing red and brown tints in the majority of deep-sea organisms. Some species, in addition to large eyes, are provided with a sort of bull's-eye lantern, from which streams of light are thrown out at the will of the animal. Phosphorescent organs act also as a lure, or they may indicate the presence of prey or the passage of an enemy. Economy of Deep-Sea Life.

In the shallower reaches of the ocean the materials on the bottom are assorted and distributed by currents in a way that produces a great variety of conditions. In some places there are siliceous or calcareous sands, in other places dead shells and pebbles ; on submarine banks, rocks and boulders prevail ; in depressions, fine muds and clays. On each of these bottoms there is usually a very different assemblage of animals. So that, although the trawl may not in shallow water bring up such a variety of organisms in any single locality as from deeper water, still the total number of genera and species inhabiting the whole area of depths less than 50 fathoms is recognised as much greater than in deeper water. With increasing depth, not only the nature of the deposits, but the other physical conditions, become more and more uniform, till a depth is reached along the continental shores facing the great oceans immediately below which the conditions become nearly uniform in all parts of the world, and where the fauna likewise presents a great uniformity. This depth is usually not far above nor far below the 100-fathom line, and is marked out by what I have elsewhere designated as the *Mud-line*.[1] The Mud-line.

In all modern seas the depth at which minute particles of organic and detrital matters in the form of mud begin to settle on the bottom of the ocean is important both from the physical and biological points of view. This depth is determined by the distribution of land and water. It is dependent on the depth and extent of the ocean or basin, and varies temporarily with seasons of strong winds and calms. In small enclosed arms of the sea, like those of the west of Scotland, the mud-line is situated at depths of from 5 to 20 fathoms, but where currents rush through narrow passages or over submarine barriers it is much deeper. In the North Sea, the oceanic mud line to the north occurs at a depth of about 80 fathoms, but on the coasts of Scotland facing the great stormy Atlantic it is often found at a depth of over 100 fathoms. In the Faroe Channel the currents rush over the Wyville-Thomson Ridge with sufficient force to prevent mud Position of the Mud-line.

[1] See Deep-Sea Deposits Chall. Exp., pp. 185 and 252.

forming on the summit, and the mud-line is met with on either side of this ridge at about 300 fathoms. In basin-like depressions within the 100-fathom line—like the Silver Pits of the North Sea—mud is formed, while it cannot rest on the rims of these basins. All the minute organic particles washed down from the land, carried away from the shallow waters by currents, or derived from the decay and death of pelagic organisms, ultimately find a resting place on the bottom in deep water, principally just about and beyond the mud-line. Here is situated the great feeding ground in the ocean. When tow-nets are dragged a foot or two immediately over this mud deposit myriads of young and adult Crustaceans are captured, nearly all of the red or brown colour characteristic of deep water, such as species of *Calanus*, *Euchæta*, *Pasiphæa*, *Crangon*, *Calocaris*, *Pandalus*, *Hippolyte*, many Amphipods, Isopods, and immense numbers of Schizopods. Fishes and Cephalopods are likewise abundant and are captured along with the Crustaceans when the trawl can be dragged near, but without touching, the bottom. The Crustaceans, many of them furnished with phosphorescent organs, are scavengers, and feed upon the organic particles that fall from the surface or are washed from shallower waters seawards and finally settle on the bottom in the quiet deep waters about and beyond the mud-line. In their turn these Crustaceans, and the other organisms about the mud-line furnish most abundant food for many migratory species, such as the herring and the salmon. The stomachs of whales and narwhals are likewise frequently crammed with Cephalopods, Schizopods, Pasiphæas, and Calanids of a deep-red colour, evidently devoured in depths of several hundred fathoms. It has been observed that ascending bodies of water, produced by tidal currents or by strong winds, frequently bring great numbers of the young and immature individuals of these mud-line animals into the surface and sub-surface waters near land masses. The majority of the animals living about and beyond the oceanic mud-line appear to have a direct development or have no free-swimming larval stage, and the same is the case with deep-sea and shallow-water polar animals. From these and other considerations it seems legitimate to suggest that these marine faunas are genetically connected with, and were originally derived from, the mud-line fauna of the present period and of the not very remote geological past. On the other hand, the great majority of the animals attached to or living on the hard bottom in shallow water above and within the mud-line in sub-tropical and especially in tropical and coral-reef regions, have pelagic larvæ, and were probably for the most part derived from the Mud-line fauna at a much more ancient date.

THE MUD-LINE THE GREAT FEEDING-GROUND IN THE OCEAN.

The difficulties connected with trawling and dredging in deep water are no doubt much greater than in shallow depths, and on the whole the explorations in very deep water have been rather limited; but taking all this, as well as the number of the Challenger's trawlings and dredgings in each zone of depth into consideration, it may be regarded as a well-established fact that the aggregate number of species and individuals is

Diminution of the Number of Benthos Species with Increase of Depth.

greater in the shallower zones of depth, and least in the greatest depths far removed from continental land. An examination of the foregoing lists and Tables I. and II. on page 1430 shows, according to the Challenger Results, a gradual decrease in the number of species with an increase of depth. While the number of specimens taken in the various trawlings and dredgings between the depths of 100 and 500 fathoms is stated at 6000, and the number of species at 2050, it will be seen that in depths greater than 2500 fathoms the number of specimens captured is only 600 and the number of species 235. All the intermediate zones show likewise a progressive diminution of specimens and species with increase of depth. These numbers only apply to the Benthos or bottom-living animals, all the doubtful specimens which may have been captured in the surface and intermediate waters having been removed from the lists in constructing these tables.

Relative Abundance of Genera in the Deep Sea.

It will be observed that in all the deeper zones the number of genera is very large relatively to the number of species. Thus the 153 undoubtedly bottom-living species taken in the zone deeper than 2500 fathoms belong to 119 genera, whereas in the zone between 100 and 500 fathoms there are 1887 species which belong to only 771 genera; in the still shallower zone—0 to 100 fathoms—there are 4248 species and only 1438 genera. In the deepest zone, therefore, the species stand to the genera in the ratio of 5 to 4, and in the shallowest zone nearly as 3 to 1. The number of genera, in relation to the number of species present, augments gradually with the greater depth throughout all the zones. The proportion of the number of new genera, which the specialists have found it necessary to establish, increases in like manner as the hauls are taken from greater depths and at a greater distance from land, and the same is true with reference to the new species.

Percentage of Species Limited to Different Zones of Depth.

The number of species in the two shallower zones which are limited to these zones is, so far as our observations go, very large, viz., 92 per cent. in the zone 0 to 100 fathoms and 75 per cent. in the zone 100 to 500 fathoms, while the number of species limited to any one of the deeper zones is considerably less, viz., 55 to 65 per cent. The same fact is illustrated by the column in Table I. on page 1430 showing the number of species taken in other zones of depth as well as in the one under consideration,[1] for although the number of species is less in the deeper zones still the percentage of species in each zone which pass into other zones of depth is higher in the deeper than in the shallower zones. Migration downwards appears to be indicated by the fact that of those species found in other zones as well as in the one under consideration a larger number is found in the zone above (shallower) than in the zone below (deeper).[2] In the

[1] The twelfth column from the left Table I., page 1430.

[2] See last seven columns in Table I., page 1430. The zone under consideration is that without figures in these columns.

shallow zones the percentage of the species procured in these zones which pass through several zones of depth is very low, while in the deeper zones the percentage of species procured in these zones which pass through several zones of depth is rather high. These facts are evidently to be accounted for by the changes in the physical conditions which take place between the depths of 100 and 500 fathoms. When once animals have accommodated themselves to deep-sea conditions there are few barriers to further vertical or horizontal migration, hence the same species is often recorded in several of the deeper zones. An examination of Table I. page 1430 shows that the percentage of *new* species from the shallower zones, which extend into the deeper zones, is relatively large. This is probably due to a large number of the Challenger's dredgings and trawlings being in rather deep water within these zones and on muddy bottoms. In all probability the deep sea was peopled by continuous migrations downwards and seawards from about the mud-line. If we suppose these migrations to have taken place from the mud-line at many different periods of time and from many different parts of the world, then it may be thus possible to account for the relatively large number of genera in the deep sea in proportion to the number of species.

Diminution in the Number of Species of Benthos with Distance from Shore.

When we take into consideration the horizontal as well as the vertical distribution, it would appear that in all the tropical and sub-tropical regions of the ocean the number of individuals and species living on the sea-bed very distinctly diminishes with the distance from the shore, and especially with the distance from continental shores. This statement would be universally true for all regions of the ocean were not the continental conditions pushed far from land by the presence of floating ice in the great Southern Ocean, and in some similar regions of the northern hemisphere. At first sight it might appear that this diminution in the number of species resulted from the greater depth at the seaward stations. This cannot, however, be the sole explanation. When the captures at the same or similar depths are compared from those stations within and those beyond 300 miles from land, it is found that the near-shore stations yield much the larger number of specimens and species. Stations in depths between 1000 and 2000 fathoms near shore give, on the average, 121 specimens and 39 species per haul; the remote stations beyond 300 miles from land and between the same limits of depth yielded only 21 specimens and 10 species per haul. In making this comparison, those stations were selected in which the conditions as to depth and other circumstances were nearly similar, excepting always the distance from a continental shore.

When the results of the trawlings and dredgings on the different kinds of deposits are compared, similar indications are obtained with reference to the relatively greater abundance of both individuals and species close to continental shores—the Terrigenous

Deposits lying along the shore-lines yielding many more animals than the Red Clays and Globigerina Oozes occupying the remote seaward positions. For instance—

Relative Number of Species and Individuals captured on Terrigenous and Pelagic Deposits.

Trawlings on Red Clay yielded—					
in Atlantic	40·0 specimens	and	7·0 species per haul.		
„ Pacific	20·3 „	„	10·7 „	„	
„ Southern Ocean . . .	50·0 „	„	30·0 „	„	
Dredgings on Red Clay yielded—					
in Atlantic	4·2 „	„	1·7 „	„	
„ Southern Ocean . . .	13·3 „	„	7·3 „	„	
Trawlings on Radiolarian Ooze yielded—					
in Pacific	35·0 „	„	14·0 „	„	
Trawlings on Diatom Ooze yielded—					
in Southern Ocean . . .	117·5 „	„	54·3 „	„	
Trawlings on Globigerina Ooze yielded—					
in Atlantic	21·1 „	„	11·5 „	„	
„ Pacific	56·5 „	„	19·2 „	„	
„ Southern Ocean . . .	96·7 „	„	44·3 „	„	
Dredgings on Globigerina Ooze yielded—					
in Atlantic	5·2 „	„	3·7 „	„	
„ Pacific	7·0 „	„	6·0 „	„	
„ Southern Ocean . . .	5·0 „	„	5·0 „	„	
Trawlings on Terrigenous Deposits yielded—					
in Atlantic	108·5 „	„	33·1 „	„	
„ Pacific	71·4 „	„	31·4 „	„	
„ Magellan Straits . . .	100·0 „	„	38·0 „	„	
Dredgings on Terrigenous Deposits yielded—					
in Atlantic	55·3 „	„	26·1 „	„	
„ Pacific	59·0 „	„	26·0 „	„	
„ Southern Ocean . . .	93·0 „	„	23·5 „	„	

The greater abundance of species and individuals procured on the Terrigenous deposits is thus clearly shown when compared with those captured on the Pelagic deposits, such as the red clays and organic oozes, excepting those of the Southern Ocean. The hauls with the trawl are, it will be noted, much more productive than those with the dredge.

Trawlings in the Great Southern Ocean.

The trawlings in the Southern Ocean are remarkable for the large number of species procured on all the different kinds of deposits in all depths and at great distances from continental land. This may be accounted for by the continental conditions being carried far to the north as above suggested, but it appears to me to be likewise due to the greater abundance of food that falls to the bottom in this region, arising from the large numbers of Plankton organisms frequently killed at the surface owing to the mixing which takes place in these latitudes of surface currents from different sources and of very different temperatures. There is a parallel to this in the Northern Atlantic and Northern Pacific, though, owing to the distribution of the land masses,

the area is much more restricted. For instance, large hauls were obtained at Station 246 in the North Pacific, and at many stations in the North Atlantic explored by the "Porcupine," "Valorous," "Triton," and "Knight Errant." The greater number of animals on the sea-floor in the Southern Ocean, the North Atlantic and Pacific, may, however, be connected with migrations of Benthos animals equatorwards from polar regions.

Comparison of the Species captured at several Deep-Sea Stations, in various Regions of the Ocean.

It is usual to assume that there is a universal and peculiar fauna of great antiquity in the deep sea. An examination of the statistics given in the foregoing pages does not seem to confirm this opinion. Let us further compare some of the results of deep-sea trawlings in different regions of the ocean.

In 1850 fathoms in mid-equatorial Atlantic (Station 106), and in 2425 fathoms mid-equatorial Pacific (Station 271), both on Globigerina Ooze, 66 species were obtained, 38 species in the first and 29 in the second Station, but only one species —the little *Discina atlantica*—was common to the two localities. The genus *Discina* ranges from the Cambrian to the present time.

In 1875 fathoms in the Northern Pacific (Station 237), and in 2050 fathoms (Station 246) also in the North Pacific, and in nearly the same latitude (35° N.), but separated from each other by about 1790 miles, 100 species were obtained, 57 species in the first and 48 in the second Station, and of these only five species were common to the two stations.

In 1375 fathoms in the Southern Ocean (Station 146), and in 1600 fathoms (Station 147) also in the Southern Ocean, and in nearly the same latitude (46° S.), but separated by only 122 miles, 145 species were obtained, 78 species in the first and 89 in the second Station, 22 of which were common to the two stations.

There is not one species common to the six above-mentioned stations. If we take the above two tropical stations as one group, the two Northern Pacific stations as a second, and the two Southern Ocean stations as a third group, then of the 290 species recorded from all three groups only two species—*Macrurus armatus* and *Eucopia australis*—or 0·7 per cent., are common to all the three groups. In the Northern Pacific and equatorial groups 160 species were obtained, of which only 6 species, or 3·7 per cent., were common to these northern and tropical Stations. In the Southern Ocean and equatorial groups 208 species were obtained, of which only 4 species, or 1·9 per cent., were common to these southern and tropical Stations. In the Northern Pacific and Southern Ocean groups 235 species were obtained, of which 10 species, or 4·2 per cent., were common to these Stations from high northern and high southern latitudes. *Discina atlantica*, *Hyocrinus bethellianus*, *Hyalonema* (*Stylocalyx*) *depressum*, *Bugula reticulata*, *Liponema multiporum*, which live attached to the bottom, are among the species common to two or more of the above Stations, but the majority of the species common to two or more Stations belong to Fishes and Crustaceans which move freely over the

bottom. Indeed, those species which are captured in the trawl when it has been dragged near, but has not touched, the bottom, or are captured in traps like those the Prince of Monaco has used in deep water, have a much wider distribution than those species which live in or fixed to the muds, clays, and oozes. It will thus be seen that in the Stations close to each other the number of species common to two Stations is greater than when the Stations are further removed from each other, but the larger percentage of species common to the Stations in the high northern and high southern latitudes, than between either of these and the equatorial Stations, is noteworthy, and seems to indicate that a resemblance can be traced in deep water between the organisms of Arctic and Antarctic regions. It must be admitted from these considerations that with reference to species there is here no striking evidence of a universal deep-sea fauna spread all over the floor of the ocean. The same groups of organisms recur, but this is also true of animals living not deeper than the mud-line.

Many of the deep-sea animals, especially those found in very deep water far from land, present archaic characters. *Discina* and other Brachiopods undoubtedly represent a very ancient group. The irregular Sea-urchins and siliceous Sponges recall the fossils of the chalk. Still it must be admitted that those who expected to find in the deep sea remnants of faunas which flourished in very remote geological periods have been much disappointed.[1] *Heliopora*, the King-crabs, Lingulas, Trigonias, *Amphioxus*, Sturgeons, Port Jackson sharks, *Ceratodus*, *Lepidosiren*, *Protopterus*, and other shore and fresh-water forms, probably represent older faunas than anything to be found at present in the deep sea. Sir Wyville Thomson was of opinion that, from the Silurian period to the present day, there had been, as now, a continuous deep ocean with a bottom temperature oscillating about the freezing-point, and that there had always been an abyssal fauna.[2] I am rather inclined to think that in Palæozoic times the ocean basins were not so deep as at the present time, that the ocean then had throughout a nearly uniform high temperature, and that life was then either absent or represented only by bacteria and other low forms in great depths, as appears to be the case at present in the Black Sea. As in the Black Sea now, so also was there in all likelihood in Palæozoic times insufficient oxygen in deep water to support a deep-sea fauna. From many considerations, one is led to suggest that cooling at the poles commenced in early Mesozoic times, that cold water, descending then in polar areas, slowly filled the greater depths, and by carrying down a more abundant supply of oxygen, life in water deeper than the mud-line became possible; subsequently migrations gradually took place from the mud-line into deep regions of the ocean basins.

Antiquity of the Deep-Sea Fauna compared with that of Shore and Fresh-Water Faunas.

The first trawlings and dredgings conducted by the Challenger in comparatively

[1] See *ante*, p. 103.

[2] Zool. Chall. Exp., vol. i. Introd. p. 47.

Resemblance between the Shallow-Water Marine Faunas of Britain and Tristan da Cunha.

shallow water in the extra-tropical regions of the southern hemisphere were those about the Tristan da Cunha group. With reference to these dredgings and trawlings, Professor Wyville Thomson wrote in the Station-book at the time: "From 150 to 100 fathoms the dredge brought up a large quantity of specimens of all groups. . . . Altogether a mass of material much like what is found off the coast of England. . . . From 75 fathoms nearly the same things were got as in 60 fathoms, notably a profusion of Alcyonarians. These shallow-water dredgings around Tristan da Cunha gave a great amount of material, the fauna being very much of the same character as that of somewhat shallower water in the north. The species seem in many cases to be identical, but this will require critical examination to determine."[1]

The general similarity between the animals from the dredgings and trawlings in high southern latitudes and those from like positions in the high northern latitudes was the subject of frequent discussion among the naturalists during the whole of the southern cruise of the Challenger. The number of identical or nearly identical Mollusc shells in the Challenger collections from the deposits in 400 fathoms off the Azores, and off the south-eastern coasts of Australia, was especially remarkable. Again, the similarity, and in many cases identity, of species from high northern and high southern latitudes is frequently pointed out by the naturalists who have written the Zoological Memoirs in the Challenger Report. This may be illustrated by the following extracts, dealing with distribution and development:—

Animals of High Northern and High Southern Latitudes.

Günther writes: "The fauna of Chili and Juan Fernandez might be described, without much exaggeration, as a mixture of European and New Zealand forms; of the fishes mentioned here two being identical with, and four representative of, European species."[2] *Lycodes* "is represented in the Southern as well as Northern Hemisphere, but it would appear from the present state of our knowledge that the Antarctic species do not descend to so great a depth as the Arctic. Probably all of the latter will be found to reach beyond the vertical limit of 100 fathoms. . . . Two species only of *Gymnelis* are known: one [*Gymnelis viridis*] from the Arctic Ocean, the other [*Gymnelis picta*] from the Straits of Magellan."[3] "The most striking character of the fauna [of the southern temperate zone] is the reappearance of types inhabiting the corresponding latitudes of the northern hemisphere, and not found in the intervening tropical zone. This interruption of the continuity in the geographical distribution of shore-fishes is exemplified by species as well as genera, for instance—*Chimæra monstrosa*, *Galeus canis*, *Acanthias vulgaris*, *Acanthias blainvillii*, *Rhina squatina*, *Zeus faber*, *Lophius piscatorius*, *Centriscus scolopax*, *Engraulis encrasicholus*, *Clupea sprattus*, *Conger vulgaris*. Instances of genera are still more numerous—*Cestracion*, *Spinax*, *Pristiophorus*, *Raja*; *Callanthias*, *Polyprion*, *Histiopterus*, *Cantharus*, *Box*, *Girella*, *Pagellus*, *Chilodactylus*, *Sebastes*, *Aploactis*, *Agonus*, *Lepidopus*, *Cyttus*, *Psychrolutidæ*, *Notacanthus*; *Lycodes*, *Merluccius*, *Lotella*, *Phycis*, *Motella*; *Aulopus*; *Urocampus*, *Solenognathus*; *Myxine*. . . . The reappearance of so specialised a genus as *Lycodes* [in the Antarctic] is most remarkable."[4]

Fishes of the Northern and Southern Hemispheres.

Herdman writes: "The discovery, so far south as Kerguelen Island, of a member of this genus [*Eugyra*], which has been hitherto found only in the northern hemisphere, is very interesting. . . . In the genus *Boltenia*, one species occurs in the extreme north, while the other two are from far south, the genus being unrepresented in intermediate latitudes. . . . In the genus *Styela*, all the species, with the exception

[1] See *ante*, p. 399.
[2] Zool. Chall. Exp., pt. vi. p. 23.
[3] Zool. Chall. Exp., pt. lvii. pp. 76, 81.
[4] Study of Fishes, pp. 281, 290, London, 1880.

of one [*Styela clava*] from the northern hemisphere, are from the southern temperate region, and most of them are from between the parallels of 30° and 40° South."[1]

Hoyle states that the genus *Bathyteuthis*, dredged by the Challenger in the Southern Ocean, has been quite recently recorded by Verrill from the North Atlantic.[2]

Miers writes: "The genus *Hypopeltarium* (common in the Straits of Magellan, Falklands, and coasts of Chili and Patagonia) is nearly allied to *Atelecyclus*, which is found both on the shores of Europe and Chili."[3]

Henderson enumerates the species of the genus *Lithodes* as follows:—

I. Northern species—
Lithodes maia, North Atlantic.
,, *camtschaticus*, Sea of Okhotsk.
,, *brevipes*, South Pacific (?); Kamtschatka.
,, *spinosissimus*, North Pacific.
,, *agassizii*, North Atlantic, deep water.
,, *ferox*, off the north-west coast of Africa, deep water.

II. Southern species—
Lithodes antarcticus, Fuegia.
,, *murrayi*, Southern Ocean.

Also the species of the genus *Anapagurus* as follows:—
Anapagurus chiroacanthus, Scandinavian and British Seas.
,, *hyndmanni*, British Seas.
,, *lævis*, Scandinavian and British Seas; Mediterranean, deep water.
,, *pusillus*, Azores, Canaries, Cape (?).
,, *australiensis*, New South Wales.

Henderson also writes: *Munida subrugosa* "may be said, indeed, to represent *Munida rugosa* in the southern hemisphere. . . . Of the Circumpolar Regions much remains to be learnt, but so far as is known their Crustacean fauna is a scanty one when compared with that of the other two divisions; in some respects they appear to gradually merge with the latter, for it has been shown that certain characteristic genera, *e.g.*, *Lithodes*, extend almost to the tropics, but are then found only in deep water where the temperature conditions are favourable. . . . Three new species of Lithodea were taken, all of them in the southern hemisphere. The members of this group were formerly believed to occur only in the shallow water of the northern and southern temperate regions, but deep-sea dredgings, more especially those of the 'Talisman,' have shown that they extend to the tropics, in which case they are confined to deep water (some of the species reaching a depth of over 1000 fathoms), where the temperature conditions are doubtless favourable to their existence. As Professor A. Milne-Edwards has pointed out, this unexpected feature in their distribution is not without interest, inasmuch as it shows the possibility of certain forms spreading from the one circumpolar region to the other, and accommodating themselves to the altered environment, in order to obtain the necessary conditions of temperature. . . . Numerous instances occur of abyssal species with a greatly extended range of distribution, and of these we may cite what is perhaps the most striking. *Munidopsis antonii*, which was captured by the 'Talisman' off the north-west coast of Africa, was taken by the Challenger in the Southern Ocean and off the island of Juan Fernandez, South America."[4]

Anomura of the Northern and Southern Hemispheres.

Spence Bate writes: "The type species [of *Pandalus*], *Pandalus annulicornis*, is European, and mostly found on the French and British coasts. Milne-Edwards records a species from the Mediterranean, Dana one from the coast of Oregon, Dr. Stimpson several species from Madeira, Australia, and the northern shores of Eastern Asia, Smith several from off the eastern coast of America, and Sars others from off the Scandinavian shores. . . . It is interesting to notice the close approximation of this species [*Palæmon affinis* from Port Jackson] to *Palæmon squilla*, the habitats being the antipodes of each other."[5]

[1] Zool. Chall. Exp., pt. xvii. pp. 82, 265.
[2] Zool. Chall. Exp., pt. xliv. p. 232.
[3] Zool. Chall. Exp., pt. xlix. p. 211.
[4] Zool. Chall. Exp., pt. lxix. pp. 42, 73, 124, 197, 212, 215.
[5] Zool. Chall. Exp., pt. lii. pp. 666, 667, 784.

Schizopoda of the Northern and Southern Hemispheres.

Sars says: "Concerning the geographical distribution of this species [*Lophogaster typicus*], the occurrence of this form in the southern hemisphere, as shown by the Challenger collection, is remarkable, and might induce the belief that it ranges from the Norwegian Sea along the whole western coast of Europe and Africa, or throughout the boreal, lusitanic, tropic, and antiboreal regions. It may, however, be considered as a highly remarkable fact, that this very striking form has never been recorded either from the coasts of England and France, or from the Mediterranean, although each of these tracts has been carefully investigated by numerous zoologists. We may therefore entertain the assumption that this form in reality does not occur throughout the intermediate tracts of the ocean, but is met with independently in both hemispheres in the corresponding region. Should this be the case, we may infer that the distribution of the species must at an earlier date have been continuous, but considerable changes afterwards occurring in the physical conditions led to a separation of the species into two independent stocks. In the sequel we shall meet with another still more striking example of a similar kind, in treating of the Mysidan *Boreomysis scyphops*, a form stated to occur in the Arctic and Subantarctic regions only, having never yet been found in any intervening tract. . . . The typical species [of *Boreomysis*] is *Boreomysis arctica*, first met with in the Arctic Sea, off Greenland, and also occurring along the coasts of Norway, where two other species, *Boreomysis tridens* and *Boreomysis megalops*, have been also observed. Moreover, on the Norwegian North Atlantic Expedition two large species were taken, *Boreomysis nobilis* and *Boreomysis scyphops*, the latter of which is also represented in the Challenger collection [from the Southern Ocean]. Finally, there are two additional species from the Challenger Expedition [one from the North Pacific and one from the North Atlantic]. . . . The total number of species thus amounts to seven. All are true deep-sea forms, the animals descending to very considerable depths, and having never been met with in shallow water. . . . The geographical distribution of this form [*Boreomysis scyphops*] is very remarkable, ranging, as it does, within the limits of well-nigh the same region in both hemispheres, and not occurring in the intermediate tracts of the ocean. As it cannot be reasonably assumed that the species has originated independently in both hemispheres, the physical condition of the sea-bottom must at some time or other have been more uniform than at present, to have admitted of the species spreading over a much more extensive area, whereas at a later period essential changes in the climatological conditions must be assumed to have caused this form to withdraw successively from the equatorial region towards the two poles, thus dividing the species into two widely separated stocks, inhabiting corresponding regions in both hemispheres. Another fact, too, viz., the remarkable occurrence . . . of the northern form, *Lophogaster typicus*, in the Southern Ocean, without its being ever met with in the intermediate tracts, may also warrant the assumption of essential changes in the physical conditions of the sea-bed having taken place at some former period, thus causing the occurrence of certain species to appear discontinuous."[1]

Sars further writes: "The development of most Schizopoda exhibits a very striking resemblance to that of the Isopoda, the young passing within the marsupium of the female through one or more so-called pupa-stages before being hatched. In the Euphausiidæ, however, a totally different mode of development has been discovered, the young of these animals being hatched in a very immature condition, and not attaining, till after an exceedingly complicated free metamorphosis, the form characteristic of the adults."[2]

Sars writes: "The genus [*Leucon*] at present comprises, besides the two new forms described below [one from Kerguelen and one from the North Pacific], nine species, seven of which are from the Northern Ocean, one from the Mediterranean, and one from the Atlantic. . . . The genus [*Diastylis*] is very abundantly represented, especially in the Northern Ocean, no less than twenty-seven distinct species having been hitherto recorded. The Challenger collection contains four species, one of which [from the North Atlantic] has been formerly described, whereas the three others [two from the North Atlantic and one from Kerguelen] are now added, increasing the number to thirty-one."[3]

Beddard, speaking of the development of spines in Isopods, writes: "This modification of structure is not, however, confined to the deep-sea species; it is found in quite as marked a degree in *Arcturus furcatus* and *Arcturus studeri* and other species of *Arcturus*; it will be noticed, however, that these species are inhabitants of the colder regions, and indeed it would appear that there is some connection between temperature and the

[1] Zool. Chall. Exp., pt. xxxvii. pp. 16, 177, 178, 182. [2] Zool. Chall. Exp., pt. xxxvii. p. 8.
[3] Zool. Chall. Exp., pt. lv. pp. 33, 44.

development of spines upon the body. It is more or less true in other groups of the Crustacea that the very spiny forms are either deep-sea, or, if shallow-water, are from the Arctic or Antarctic shores, where the conditions of temperature are not so widely different." [1]

Brady writes: "As to the relations between the Ostracoda of distant parts of the globe and those of the European seas,—or rather of the British and Scandinavian seas, those being the only districts which, as yet, have been tolerably well explored,—some scanty, though interesting, observations may be made. I have, elsewhere, had occasion to note the occurrence at Kerguelen Island of a very common European Copepod, *Harpacticus fulvus*, which in that distant spot inhabits precisely the same sort of places as in Europe. And now, in the lists of the Kerguelen Island Ostracoda, we may notice an affinity with the European fauna much closer than that of any other locality coming into the scope of this memoir. The British residents found in that distant home are *Pseudocythere caudata*, *Sclerochilus contortus*, *Paradoxostoma abbreviatum*, *Krithe bartonensis*, *Xestoleberis depressa*, and *Polycope orbicularis*. . . . *Xestoleberis depressa* [taken at Kerguelen and Heard Islands] is a common species in the Northern Hemisphere, having been found in the seas of Great Britain, Ireland, Norway, Spitzbergen, and the Gulf of St Lawrence . . . It is not a little remarkable that one of the two species [of *Paradoxostoma*] described in this monograph (*Paradoxostoma ensiforme*) is from a European dredging, and is a well-known European species, while the other, also known as an inhabitant of Europe, is from Kerguelen Island, a locality which, of all others, has shown in its entomostracan fauna a close resemblance to that of Europe. . . . Zoologically, the most remarkable character of *Xestoleberis* is its being viviparous; the fry are retained within the shell of the mother until very fully developed; this, perhaps, may account for the great posterior expansion of the female carapace." [2]

M'Intosh states: "The members of this family [Ampharetidæ] . . . are perhaps more abundant in Arctic and Antarctic seas than in the warmer oceans." [3]

Théel writes: "*Elpidia glacialis* is found in the Arctic Ocean and in the North Atlantic, in addition to which one individual has been brought home from Station 160, South of Australia. *Lætmogone violacea* was dredged by the Challenger Expedition close to Sydney, and during the cruise of the 'Knight Errant' between the Faroe Islands and the coast of Scotland. . . . It cannot be doubted that those two almost antipodal forms will be found at many interjacent localities when a larger area of the oceanic abysses has been explored . . . The discovery of this specimen [of *Elpidia glacialis*] in a locality so far south as the neighbourhood of the Antarctic sea is of the greatest interest, considering that this species during the last six or seven years has been found living rather commonly in the North Atlantic Ocean and in the Arctic Ocean (Sea of Kara). *Elpidia glacialis* seems able to exist under very various conditions; the individual brought home by the Challenger Expedition proves that it lives at the greatest depth, up to 2600 fathoms, while those from the Arctic sea are found at depths of only 50 to 150 fathoms. . . . [*Kolga nana*] is not the only example among the Holothurids from the great depths of the sea, where representatives of the same species or at least of the most nearly allied forms are found in or near the Arctic sea, and also in the neighbourhood of the Antarctic Ocean." [4]

Holothurioidea of the Northern and Southern Hemispheres.

Théel says further: "With respect to the Arctic and Antarctic regions, the observations hitherto made seem to establish that not a single species of the [shore] Holothurioidea is common to both seas. Notwithstanding this the shallow-water fauna of the two regions possesses much the same features. Thus the northern forms, *Cucumaria frondosa*, *Trochostoma borealis*, *Psolus squamatus*, *Psolus fabricii*, *Holothuria intestinalis*, &c., are represented in the Antarctic Sea by *Cucumaria lævigata*, *Cucumaria crocea*, *Trochostoma violacea*, *Psolus ephippifer*, *Psolus antarcticus*, and *Holothuria magellani*. I have had all these forms at my disposal, with the exception of *Holothuria magellani*, and they appear to be distinct from one another, though the distinguishing characters, it must be confessed, often seem to be rather inconsiderable, and possibly not of specific value. It is, however, of importance not to neglect such small characters, which unquestionably have a much greater consequence than may be at first supposed. According to my opinion, every example proving that the Arctic and Antarctic shallow-water faunæ are different is of value, for I cannot conceive how it is possible that they can have animals which are entirely similar. Of course, I do not take into consideration such forms as pass their existence on the bottom of the deep sea or at the

[1] Zool. Chall. Exp., pt. xlviii. p. 167.
[2] Zool. Chall. Exp., pt. iii. pp. 4, 124, 125, 149, 150.
[3] Zool. Chall. Exp., pt. xxxiv. p. 424.
[4] Zool. Chall. Exp., pt. xiii. pp. 4, 18, 19, 42.

surface of the ocean. It appears scarcely probable that the shore fauna of two regions so far separated from each other as the Arctic and Antarctic Seas has any direct exchange of forms at the present epoch, so as to allow the same species, in its larval or adult state, to pass from one pole to the opposite without settling at interjacent regions. In brief, I do not believe that at the present epoch the Arctic shallow-water fauna can directly originate from the Antarctic, or *vice versa*. On the other hand, it is a fact that the two faunæ in question resemble each other very closely, and, with regard to the Holothurids, that several forms occur in the Arctic Sea which are most closely allied to those in the Antarctic. I am inclined to suppose that the progenitors of these Holothurids have had a much wider distribution during a past period, that altered physical conditions, a keener struggle for existence, &c., under the tropic and the temperate zones have effected their extinction, or their migration towards the polar seas, or even produced changes in their organisation and general appearance so marked, that their descendants which still remain in the tropical zones present themselves as species distinct from the original, and finally, that the polar seas, with their more uniform physical conditions, allowed them and their descendants to live there and to develop slowly but continuously after almost the same plan. The genus *Psolus* offers an instructive example of forms which are distributed over all seas from the Arctic to the Antarctic, and which are so very little differentiated that we scarcely acknowledge them as distinct species. Thus the northern species, *Psolus squamatus* and *Psolus fabricii*, pass imperceptibly into *Psolus operculatus*, *Psolus complanatus*, and several other tropical or subtropical forms, which in their turn are replaced towards the Antarctic regions by *Psolus antarcticus* and *Psolus ephippifer*, &c. But it must be observed that all these forms of *Psolus*, though they apparently present great similarities, are nevertheless distinguishable, though the differences may or may not be of specific value. It appears pretty evident that they are all descendants from the same ancestors, which may have had their origin in the polar seas or in the tropic or subtropic oceans, and that they, in their wide dispersion, have sustained very well the influence of altered and very various physical conditions in different regions of the world. But, of course, different physical conditions and an altered mode of life have caused some small deviations in internal and external organisation."[1]

Agassiz writes: "I am unable to distinguish the specimens of this species [*Echinocardium flavescens*] collected at the Cape of Good Hope from the northern ones. There seems to be a number of northern species of Spatangoids which extend to the Cape; among them are to be mentioned also *Brissopsis lyrifera*, *Spatangus raschi*, and *Schizaster fragilis*."[2]

Sladen writes: "So far as at present known this genus (*Stichaster*) appears to be confined to the temperate and frigid zones; and most of the species are probably limited bathymetrically to the Littoral zone, only two occurring in the Continental zone and one in the Abyssal zone. . . . *Lophaster* was hitherto known only from the North-Atlantic area. The Challenger obtained examples of a form which I consider referable to the genus from the South Pacific, thus adding another example to the remarkable list of representative forms found in the temperate and sub-frigid zones of the Northern and Southern hemispheres respectively. . . . For a long time the genus *Cribrella* was thought to be represented by a single species only, and to be confined to the northern portion of the Atlantic. Within the last twenty years a number of other species have been discovered, and the genus is found to have a wide area of distribution in the Southern as well as in the Northern temperate and sub-frigid zones. In the higher latitudes north of the Equator *Cribrella* is the only representative of the family, but in its approach towards the southern pole it is accompanied by the allied genus *Perknaster*. Its bathymetrical range is greater than that of any other genus of Echinasteridæ, it being the only representative of the family in the Abyssal zone . . . Since the discovery of this genus [*Pedicellaster*] in the North Atlantic area a number of forms have been referred to it, which indicate a wide range of distribution. Although I am inclined to think that the whole of the species now ranked as *Pedicellaster* may not ultimately be retained in the genus, the occurrence of representative forms in the higher latitudes of the Northern and Southern hemispheres is fully established."[3]

Asteroidea of the Northern and Southern Hemispheres.

Carpenter writes: "Closely allied to the North Atlantic species [of Comatulæ] are those occurring at Kerguelen and Heard Island, together with a couple of forms inhabiting the Strait of Magellan. This

[1] Zool. Chall. Exp., pt. xxxix. pp. 259, 260.
[2] Zool. Chall. Exp., pt. ix. p. 175.
[3] Zool. Chall. Exp., pt. li. pp. 430, 458, 459, 540, 557.

Southern Ocean has also yielded *Promachocrinus*, the unique *Thaumatocrinus*, and at 2600 fathoms a minute *Antedon*, which was also found at 2900 fathoms in the North Pacific. . . . The Magellan and Heard Island species [of *Antedon*] from the furthest south are the Antarctic representatives of *Antedon eschrichti* and *Antedon quadrata*, which are widely distributed in the Arctic Ocean." [1]

Allman states: "It is a fact not destitute of interest that no less than three . . . British species, *Obelia geniculata*, *Lafoëa fruticosa*, and *Sertularia polyzonias*, have been brought by the Challenger from the Fuegian region, and thus indicate a similarity of conditions between the northern and southern regions which shows itself in the appearance of the same species in both. . . . *Perisiphonia filicula* [obtained in the Australian region at a depth of 150 fathoms] was also found in the Azoric region at a depth of 450 fathoms, and thus affords an instance of the same species occurring in two regions so widely separated as the Azores and Australia, without any intermediate station offering an example of it. *Grammaria*, already known as a northern form, is represented in the Challenger collection by three new species, all from a comparatively narrow zone of southern latitude, *Grammaria insignis* from Marion Island, *Grammaria stentor* from Kerguelen, and *Grammaria magellanica* from the Fuegian region. All the three species thus occur at moderate depths, and their distribution is interesting as affording an example of stations, for the most part widely separated in longitude, and yet lying within a few degrees of the same parallel of latitude. . . . *Sertularia operculata*, an abundant and characteristic species of the British Laminarian zone, is shown to have a singularly wide area of distribution, having been brought up by the dredge of the Challenger from a depth of 45 fathoms off the western coast of Patagonia. . . . *Obelia geniculata* is one of the few British Hydroids obtained by the Challenger. In the British and European seas it is one of the commonest and most widely distributed species, while it has also been obtained on the eastern and western shores of the United States, and on the coast of Labrador, as well as in the seas round the North Cape. The Challenger dredged it from two localities, one in the region of Kerguelen Island, and the other in that of the Falkland Islands. Both therefore in nearly the same southern latitudes, though separated by about 130° of longitude. The distance between these extreme southern localities and the Arctic Ocean, in which it has been found by Sars, affords one of the most striking examples known of the wide geographical distribution of a single species." [2]

Hydroida of the Northern and Southern Hemispheres.

Wright and Studer write: "The species of this genus [*Alcyonium*], as now restricted, are inhabitants of the temperate portions of all the three oceans. The species of this genus [*Lobularia*], which is closely related to the last, seem to occupy the tropical portions of the three oceans, therein taking the place of the others." [3]

Sollas writes: "The Theneid [from the South Australian province]—*Thenea grayi*—is not a very distinct form, since it much resembles *Thenea muricata* of the Arctic province. . . . The Indo-Antarctic fauna is possibly the remnant of one once associated with that of an Antarctic continent, now preserved in isolation by its remoteness from all other areas." [4]

The resemblances between the littoral faunas and floras of the Arctic and Antarctic regions have been incidentally pointed out by other authors of the Challenger Memoirs, and by many other naturalists. From the statements in the above extracts it will be seen that there have been many speculations as to the causes by which these resemblances have been brought about. The relations of the Arctic and Antarctic littoral faunas has also been recently discussed with reference to the zoological collections brought home by the German Expedition from South Georgia.[5] In this place it is proposed to examine the distribution of the animals captured by the Challenger in three great zones of latitude, viz., those taken within the tropics, those taken

Comparison of Species from High Northern and High Southern Latitudes.

[1] Zool. Chall. Exp., pt. lx. pp. 30, 33.
[2] Zool. Chall. Exp., pt. lxx. pp. lvi., lviii., 23.
[3] Zool. Chall. Exp., pt. lxiv. p. 295.
[4] Zool. Chall. Exp., pt. lxiii. pp. 389, 391.
[5] Die niedere Thierwelt des Antarktischen Ufergebietes, von Dr. Georg Pfeffer, Die International Polarforschung, 1882–1883, Die Deutschen Expeditionen und ihre Ergebnisse, Bd. ii., p. 455; Pfeffer, Versuch über die erdgeschichtliche Entwickelnng, Hamburg, 1891.

south of the tropic of Capricorn, and those taken north of the tropic of Cancer. In the foregoing lists (pages 1277–1429), as previously stated, the letter **T** after a name indicates that the species was taken within the tropics; **N** in like manner indicates the northern, and **S** the southern great zone of latitude. An examination of these lists with reference to the animals occurring north and south of the tropics, but not within the tropics, brings out some interesting results.

The following 91 species were taken by the Challenger to the *South and North* of the tropics, and not within the intervening tropical zone, but 11 of these species (marked thus *) are recorded from other sources as having been obtained within the tropics :—

KERATOSA :

Psammopemma densum, Marshall.

MONAXONIDA :

**Halichondria panicea*, Johnston.
**Tedania digitata* (Schmidt).
Tentorium semisuberites (Schmidt).

HEXACTINELLIDA :

Aulocalyx irregularis, n.g., n.sp.
Chonelasma lamella, n.g., n.sp.

ACTINIARIA :

Cereus spinosus, n.sp.
Liponema multiporum, n.g., n.sp.

CORALS :

Caryophyllia communis (Seguenza).
Cladocora arbuscula, M.-Edwards and Haime.
Flabellum apertum, n.sp.

HYDROIDA :

Halecium beanii, Johnston.
Perisiphonia filicula, n.g., n.sp.

CRINOIDEA :

Antedon abyssicola, n.sp.

ASTEROIDEA :

Dytaster exilis, n.g., n.sp.
Pontaster forcipatus, n.g., n.sp.

OPHIUROIDEA :

Ophiacantha rosea, n.sp.
Ophiernus vallincola, n.g., n.sp.
Ophiocten hastatum, n.sp.
Ophioglypha bullata, n.sp.
,, *confragosa*, n.sp.

ECHINOIDEA :

**Echinocardium australe*, Gray.
Echinus norvegicus, Düben and Koren.
Phormosoma hoplacantha, n.sp.
**Schizaster fragilis* (Düben and Koren).

HOLOTHURIOIDEA :

Euphronides depressa, n.g., n.sp.
Holothuria lactea, n.sp.
,, *thomsoni*, n.sp.
Kolga nana, n.sp.
Lætmogone wyville-thomsoni, n.g., n.sp.
Psolus operculatus, Pourtalès.
Trochostoma albicans, n.sp.

NEMERTEA :

Cerebratulus macroren, n.sp.
Pelagonemertes rollestoni, n.g., n.sp.

ANNELIDA :

Eunice ærstedi, Stimpson.
,, *vittata*, Delle Chiaje.
Eupista darwini, n.g., n.sp.
Placostegus ornatus, Sowerby.
Terebellides strœmi, Sars.

OSTRACODA :

Bairdia minima, n.sp.
Cythere irpex, n.sp.
,, *scabrocuneata*, n.sp.
,, *suhmi*, n.sp.

CIRRIPEDIA :

**Balanus trigonus*, Darwin.
Scalpellum acutum, n.sp.
,, *velutinum*, n.sp.

ISOPODA :

Bathytanais bathybrotes, n.g., n.sp.
Eurycope atlantica, n.sp.
,, *fragilis*, n.sp.
Neotanais americanus, n.g., n.sp.
Typhlotanais kerguelenensis, n.sp.

SCHIZOPODA :

Gnathophausia gigas, n.g., n.sp.
Nematoscelis megalops, n.g., n.sp.

MACRURA :

Glyphocrangon rimapes, n.sp.
Pasiphæa acutifrons, n.sp.

ANOMURA :

Anapagurus pusillus, n.sp.
Munidopsis subsquamosa, n.sp.

BRACHYURA :

**Calappa flammea* (Herbst).

LAMELLIBRANCHIATA :

Cardita calyculata (Linné).
Lima goliath, Sowerby.
,, (*Mantellum*) *loscombii*, Sowerby.
**Saxicava arctica*, Linné.

SCAPHOPODA AND GASTEROPODA :

**Crepidula aculeata* (Gmelin).
Dentalium dentalis, Linné.
,, *keras*, n.sp.
Ianthina rotundata, Leach.
Marginella (*Glabella*) *musica*, Hinds.
Pleurotoma (*Genota*) *engonia*, n.sp.
Trochus (*Margarita*) *infundibulum*, n.sp.

POLYPLACOPHORA :

Acanthopleura incana (Gould).

CEPHALOPODA :

Taonius suhmi, n.sp.

POLYZOA :

Ætea anguina (Linné).
Bifaxaria abyssicola, n.g., n.sp.
Cribrilina monoceros (Busk).
**Hippothoa divaricata*, Lamouroux.
Idmonea atlantica, Forbes.
,, *milneana*, d'Orbigny.
Kinetoskias cyathus, n.sp.
Membranipora galeata, Busk.
Micropora coriacea (Esper).
Retepora victoriensis, n.sp.

BRACHIOPODA :

**Terebratulina caput-serpentis*, Linné.

TUNICATA :

**Ascidia nigra* (Savigny).
Doliolum affine, n.sp.
Pyrosoma spinosum, n.sp.

FISHES :

Callionymus lunatus, Schleg.
Halosaurus macrochir, n.sp.
Macrurus parallelus, n.sp.
Myxine australis, Jen.
Synaphobranchus bathybius, n.sp.
Trachurus trachurus, Linné.

The following 85 species, taken by the Challenger to the *south* of the tropics, are recorded from other sources to the *north* of the tropics, and, as far as can be gathered from the Challenger Zoological Reports, are not known from the intervening tropical zone :—

KERATOSA :

Spongelia spinifera, Schulze.

MONAXONIDA :

Axinella erecta (Carter).
Desmacidon fruticosa (Montagu).
Esperiopsis edwardii (Bowerbank).
Halichondria caduca, Bowerbank.
Iophon pattersoni (Bowerbank).

ALCYONARIA :

Sarakka crassa, Danielssen.

CORALS :

Stylaster erubescens, Pourtalès.

HYDROIDA :

Eudendrium rameum (Pallas).
Lafoëa fruticosa, Sars.
Obelia geniculata (Linné).
Sertularia operculata, Linné.
,, *polyzonias*, Linné.

OPHIUROIDEA :

Amphiura squamata, Sars.

ECHINOIDEA :

Brissopsis lyrifera (Forbes).
Echinocardium flavescens (Müller).
Spatangus raschi, Lovén.
Pourtalesia phiale, Wyville Thomson.

HOLOTHURIOIDEA :

Chirodota japonica, Marenzeller.
Colochirus spinosus (Quoy and Gaimard).
Elpidia glacialis, Théel.
Lætmogone violacea, n.sp.
Psolus squamatus, Düben and Koren.

NEMERTEA :

Drepanophorus serraticollis, Hubrecht.

GEPHYREA :

Phymosoma japonicum, Grube.

ANNELIDA :

Brada whiteavesii, n.sp.
Glycera tesselata, Grube.
Scalibregma inflatum, Rathke.

OSTRACODA :

Cytherura rudis, Brady.
Paradoxostoma abbreviatum, Sars.
Pseudocythere caudata, Sars.
Sclerochilus contortus (Norman).
Xestoleberis depressa, Sars.

AMPHIPODA :

Eusirus longipes, Boeck.

SCHIZOPODA :

Boreomysis scyphops, Sars.
Lophogaster typicus, Sars.
Stylocheiron longicorne, n.g., n.sp.

MACRURA :

Palæmon affinis, M.-Edwards.

ANOMURA :

Munidopsis antonii (M.-Edwards).

BRACHYURA :

Lispognathus thomsoni (Norman).

LAMELLIBRANCHIATA :

Glomus nitens, Jeffreys.
Kellia suborbicularis (Montagu).

Gasteropoda :

Aplysia depilans, Linné.
Cerithium vulgatum, Bruguiére.
„ (*Lampania*) *australe*, Quoy and Gaimard.
Homalogyra atomus (Philippi).
Natica (*Lunatia*) *grönlandica*, Beck.
Odostomia rissoïdes, Hanley.
Puncturella noachina (Linné).
Ringicula doliaris, Gould.
Rissoa (*Onoba*) *arenaria* (Mighels).
Trochus (*Photinula*) *tæniatus* (Sowerby).

Cephalopoda :

Argonauta argo, Linné.
Eledone verrucosa, Verrill.
Rossia sublevis, Verrill.

Polyzoa :

Alecto granulata, M.-Edwards.
Chorizopora brongniartii (Audouin).
Cribrilina radiata (Moll).
Crisia eburnea (Linné).
Diachoris magellanica, Busk.
Diastopora patina (Lamarck).
Escharoides verruculata (Smitt).
Frondipora verrucosa (Lamouroux).
Hornera lichenoides (Linné).
„ *violacea*, Sars.
Idmonea marionensis, Busk.
Lichenopora hispida (Fleming).
Membranipora crassimarginata (Hincks).
Pustulopora deflexa (Smitt).
„ *proboscidea*, M.-Edwards.
„ *proboscidioides* (Smitt).
Salicornaria tenuirostris, Busk.
Scrupocellaria pilosa (Audouin).
Tubulipora fimbria, Lamarck.
„ *flabellaris* (Fabricius).

Brachiopoda :

Platydia anomioides (Scacchi).

Tunicata :

Boltenia legumen, Lesson.
Leptoclinum tenue, n.sp.
Microcosmus polymorphus, Heller.
Styela gyrosa (Heller).

Fishes :

Acanthias blainvilli, Risso.
Halargyreus johnsoni, Günther.
Notacanthus bonapartii, Risso.
Scopelus macrolepidotus (Johnston).
Stomias boa, Risso.

The following species, taken by the Challenger to the *north* of the tropics, is recorded from the south :—

Polyzoa :

Idmonea irregularis, Meneghini.

The following species, not taken by the Challenger, are stated in the Reports to have been procured only in the north and south :—

Corals :

Stylaster gemmascens, M.-Edwards and Haime.
,, *sanguineus*, M.-Edwards and Haime.

Asteroidea :

Pycnopodia helianthoides (Brandt), Stimpson.

Cirripedia :

Acasta spongites (Poli).
Pollicipes polymerus, Sowerby.

Pycnogonida :

Achelia lævis, Hodge.
Pycnogonum litorale (Ström).

The following 106 genera are represented in the Challenger collections by species taken only to the *north and south* of the tropics, and not in the intervening tropical zone, but 14 of these genera (marked thus *) are known from other sources to occur in the tropics :—

Deep-Sea Keratosa :

Holopsamma.

Monaxonida :

**Tedania.*
Tentorium.

Hexactinellida :

Aulocalyx, n.g.
Bathydorus, n.g.
Caulophacus, n.g.
Poliopogon, n.g.

Alcyonaria :

**Sympodium.*

Pennatulida :

Anthoptilum, n.g.
Virgularia.

Actiniaria :

Cereus.
Corticifera.
Liponema, n.g.
Paractis.
Porponia, n.g.
Sicyonis, n.g.

Hydroida :

Halecium.
Perisiphonia, n.g.

Asteroidea :

**Cribrella.*
**Crossaster.*
Leptoptychaster.
Pseudarchaster, n.g.
**Pteraster.*
Solaster.
Stichaster.

Ophiuroidea :

Ophiernus, n.g.
Ophiocten.
**Ophiomyces.*

Echinoidea :

Echinocardium.
Spatangus.
**Strongylocentrotus.*

Holothurioidea :

Achlyonice, n.g.
Ankyroderma.
Elpidia.
Euphronides, n.g.
Kolga.
Lætmogone, n.g.
**Psolus.*
Trochostoma.

Nemertea :

Pelagonemertes, n.g.

Annelida :

Amphicteis.
Eupista, n.g.
Eusyllis.
Euthelepus, n.g.
Evarne.
Lanassa.
Leæna.
Leanira.
Lumbriconereis.
Nicomache.

Placostegus.
Staurocephalus.
Terebella.

Ostracoda :
Paradoxostoma.

Amphipoda :
Amaryllis.
Anonyx.
Euthemisto.
Halirages.
Pardalisca.
Pleustes.
Rhachotropis.

Isopoda :
Bathytanais, n.g.
Ischnosoma.
Neotanais.
Typhlotanais.

Cumacea :
Diastylis.
Leucon.

Schizopoda :
Boreomysis.

Macrura :
Brachycarpus, n.g.
Hepomadus, n.g.
Pandalus.

Anomura :
Anapagurus.
**Cryptodromia.*
Lithodes.

Brachyura :
**Achæus.*

Pycnogonida :
**Colossendeis.*

Lamellibranchiata :
Astarte.
Modiolaria.
Saxicava.
Yoldia.

Gasteropoda :
Buccinum.

Polyplacophora :
Chiton.

Cephalopoda :
Rossia.
Taonius.

Polyzoa :
Ætea.
**Canda.*
Cribrilina.
Flustramorpha.
**Hippothoa.*
Menipea.
Micropora.

Tunicata :
**Ascidia.*
Bathyoncus, n.g.
Boltenia.
Clavelina.
Didemnum.
Hypobythius, n.g.
Styela.

Fishes :
Engraulis.
Haloporphyrus.
Latilus.
Myxine.
Notacanthus.
Raja.
Syngnathus.
Trachurus.

The following 34 genera, represented in the Challenger collections by species taken to the *south* of the tropics, are recorded from other sources to the *north* of the tropics, and, as far as can be gathered from the Challenger Zoological Reports, are not known from the intervening tropical zone :—

Monaxonida :
Iophon.

Tetractinellida :
Astrella.
Stelletta.
Stryphnus.

Hexactinellida :
Acanthascus.
Rhabdocalyptus.
Rossella.

ALCYONARIA :
Anthomuricea.

HYDROIDA :
Eudendrium.
Grammaria.

ASTEROIDEA :
Bathybiaster.
Calliaster.
Ctenodiscus.
Lophaster.
Mimaster.

ANNELIDA :
Travisia.

ISOPODA :
Apseudes.

SCHIZOPODA :
Amblyops.
Mysidopsis.
Pseudomma.

ANOMURA :
Paralomis.

BRACHYURA :
Cancer.

LAMELLIBRANCHIATA :
Crenella.
Kellia.

GASTEROPODA :
Jeffreysia.

NUDIBRANCHIATA :
Archidoris.
Euplocamus.
Rizzolia.

CEPHALOPODA :
Bathyteuthis.

BRACHIOPODA :
Waldheimia.

TUNICATA :
Eugyra.
Sidnyum.

FISHES :
Lycodes.
Paraliparis.

The following 15 genera, some of which were not taken by the Challenger, are mentioned in the Challenger Reports as having been recorded from *north and south* of the tropics, but not (or only doubtfully) from within the tropics :—

TETRACTINELLIDA :
Asteropus.
Pachastrella.

HEXACTINELLIDA :
Chonelasma.

ALCYONARIA :
Acabaria.
Eunephthya.
Plumarella.

ASTEROIDEA :
Brisinga.
Lonchotaster.
Porania.

PYCNOGONIDA :
Achelia.
Pallene.
Pycnogonum.
Tanystylum.

FISHES :
Gymnelis.
Melanostigma.

It is evident that a number of these species and genera may have been already recorded, or may yet be procured, from the tropics, but, on the other hand, it is certain that the list of Benthos animals occurring both in high northern and high southern latitudes, and not in the intervening tropics, could be greatly increased had it been considered desirable to include information concerning shallow-water organisms from other sources than the Challenger Report, to which this discussion is limited.

The general results bearing on the distribution, in the different zones of depth, of the Benthos animals procured by the Challenger, as well as their distribution in the three great zones of latitude above indicated, are exhibited in Tables I. and II. on page 1430. An examination of Table II. shows that the species common to all the three zones of latitude on the whole increase in number as the depth of the zone decreases, and the same is true of the species taken only in the northern and southern zones and not within the tropics; the increase is not quite regular throughout the shallower zones, owing, apparently, to the relatively small number of species preserved from the Challenger's dredgings in the shallow waters of the northern temperate regions. The percentage, however, of the species from any one zone of depth which are common to all the three zones of latitude or to the northern and southern zones and not present within the tropical zone, is less in the shallower than in the deeper zones. In all the deeper zones the number of species from any one zone which occur in all the three zones of latitude in any depth whatever does not exceed 9 per cent. of the total number taken in that zone of depth. For instance, of the 153 species taken in depths beyond 2500 fathoms, only 14 species are found in all the three zones of latitude, viz., the tropical, northern, and southern zones; 8 are common to the northern and southern zones, but do not occur in the intervening tropical zone; 5 are common to the tropical and southern zones, and 6 common to the tropical and northern zones. Again, of the 493 species taken in the zone between 1000 and 1500 fathoms, only 34 are common to the three great zones of latitude in any depth whatever, 28 are common to the northern and southern zones, 26 common to the tropical and southern zones, and 48 common to the tropical and northern zones. It thus appears that only a relatively small percentage of Benthos animals have a very wide distribution over the floor of the ocean.

Comparison of the Distribution of Species in different Zones of Latitude and different Zones of Depth.

If, for illustration of this subject, we limit our attention to the species captured in the southern zone of latitude, that is, to the south of the tropic of Capricorn, we find that about 3000 species were procured by the Challenger at all depths, belonging to about 1250 genera. The number of species actually described and recorded in the special Zoological Reports amounts to 2814 species, belonging to 1179 genera. 2476 of these species belonging to 949 genera were taken in this southern zone only, while 338 species belonging to 230 genera extend into one or both of the other great zones of latitude, hence 88 per cent. of the species captured are limited to the southern zone, while only 12 per cent. extend to the tropical and northern zones. An analysis of the above lists shows that 172 species, or about 6 per cent. of the species captured in the southern zone, are recorded in the reports from the northern zone, but not from the intervening tropical zone. This points to a greater similarity between the widely separated polar zones than between contiguous zones. The similarity would be still more striking had representative species of genera occurring in the northern and

Distribution of Species Captured South of the Tropic of Capricorn.

southern zones of latitude, and not in the intervening tropics, been taken into consideration.

Let us now limit our attention to species taken in the southern zone of latitude in depths greater than 500 fathoms which may be considered as representing the deep-sea fauna. To the south of the tropic of Capricorn the Challenger procured 793 species from depths greater than 500 fathoms, all of which live on the bottom or close to it. 610 of these, or 76·9 per cent., are limited to the southern zone of latitude, 48 species, or 6 per cent., occur in all the three zones, and 52 species, or 6·5 per cent., occur in the northern and southern zones and not in the intervening tropics. Nearly similar results are obtained by limiting our examination to the species captured deeper than 1000 fathoms, 1500 fathoms, and so on. If we now turn our attention to the animals captured in the shallower zones in the southern zone of latitude, it will be found that the species captured in depths less than 500 fathoms numbered 1875, and of these 102 species, or 5·4 per cent., occur in the northern zone, and not in the intervening tropics. Speaking generally, the percentage of species occurring in all the three great zones of latitude is slightly higher in the deeper zones than in the shallower, but the percentage of species which occur in the northern and southern zones, and not in the intervening tropics, remains nearly the same in deep and in shallow water when the species given on pages 1446 to 1450 are taken into consideration. From this examination again, it does not appear that there is any sufficient evidence for the belief in a universal deep-sea fauna of great antiquity. There are many indications that the migration into the deep sea has taken place continuously since Mesozoic times, when possibly cooling set in at the poles, and is even now going on. The indications that this migration is taking place principally from polar regions are more distinct than those of migration from any other quarter, although instances might be cited of groups now living in tropical regions about the mud-line which have apparently a much wider distribution in the deep sea.

Species Captured in Depths Greater than, and Less than, 500 Fathoms.

In all the shallow-water dredgings about the islands of the Great Southern Ocean, such as Kerguelen, Heard Island, the Falklands, and Crozets, numerous species of the Isopod genus *Serolis* were procured on muddy deposits. Species of this genus, modified for deep-sea life, were likewise obtained in diminished numbers at great depths in high southern latitudes, and some large species were dredged in very deep water as far north as the equator, although the genus is not represented in the littoral region in these latitudes, and, with one doubtful exception, there do not seem to be any representatives of the genus north of the equator. This may be taken as an instance of how animals have spread from the mud-line to deeper zones and from the Antarctic area northward over the floor of the ocean, but it is altogether improbable that littoral species can, as has been suggested, pass by way of the deep sea from the littoral zone of one polar region to that of the other.

Distribution of the Genus Serolis.

In addition to the strictly benthonic animals living attached to or creeping over the bottom, there are likewise in deep-water regions numerous Fishes, Crustaceans, and other organisms which live within about 100 fathoms of the bottom and occasionally rest upon it. These species are frequently taken in the trawls when this instrument has been dragged immediately over but not allowed to touch the mud or ooze covering the bed of the sea, and are also captured in the cages or traps let down into deep water. It has, however, been doubted whether the intervening waters in mid-ocean between one hundred fathoms above the bottom and a few hundred fathoms beneath the surface are inhabited by marine organisms. The tow-net experiments carried out on board the Challenger during several years in all parts of the world led me to the conviction that these intermediate regions were inhabited, although with a much less abundant fauna than the waters near the bottom or those near the surface of the ocean. Thousands of hauls of the tow-nets were taken in the surface and sub-surface waters, and the contents were daily submitted to microscopic examination; the forms present in these waters became quite familiar to the naturalists. When, however, the tow-nets were sent down to deep water, and dragged in depths as nearly as possible of 500, 1000, and 2000 fathoms, organisms—such as the Tuscaroridæ among the Radiolaria—were nearly always observed in the gatherings in addition to the usual surface organisms. Organisms from these intermediate layers of water appear to have a much wider horizontal distribution than the surface fauna or flora. These oft-repeated experiments produced a strong belief that all the intermediate zones of depth were inhabited. I am not aware that the Tuscaroridæ have ever been taken in the surface or sub-surface waters. It is probable that the animals in the intermediate zones of depth obtain their food by the capture of the dead organisms continually falling from surface to bottom. It is well known that the deposits at the bottom are in most regions chiefly made up of the dead shells and skeletons of surface organisms. We have no definite ideas as to the rate at which these surface creatures may be falling to the bottom, but it is evident that nets which have been dragged in these intermediate depths on the opening and closing principle, without capturing any of these falling organisms, have either not been dragged for a sufficiently long time and through a sufficiently great extent of water, or have not worked successfully.

The Fauna of the Intermediate Depths in Ocean Waters.

The surface and sub-surface organisms are distributed in zones of latitude similar to the benthonic animals and plants of the shallow-water regions along the shore, but a very much greater number of the species are circum-tropical, circum-boreal, circum-antiboreal, and circum-polar. Species of Diatoms, Coccospheres, Rhabdospheres, *Pyrocystis*, Oscillariæ, Protococcaceæ, *Halosphæra*, and the yellow cells of Radiolaria and Foraminifera together with other unicellular Algæ, abound in the surface-waters

Pelagic Algæ.

of the ocean. At the present day these Algæ are the primary source of food for the majority of pelagic and deep-sea animals. Rhabdospheres are only found in the warmer waters of the ocean, but the Coccospheres abound in the northern and southern temperate zones; in the Arctic and Antarctic zones these calcareous unicellular Algæ are replaced by species of Protococci which are identical in the two polar regions. Many pelagic Diatoms of the Arctic and Antarctic are likewise identical.

Pelagic Foraminifera.

The pelagic Foraminifera are represented in the surface-waters of the tropics by about twenty species. These are replaced in the waters of the northern temperate and southern temperate regions by a lesser number of species possessing less massive shells; only two dwarfed but identical species, *Globigerina dutertrei* and *Globigerina inflata*, extend to the waters about the Arctic and Antarctic circles.

Pelagic Molluscs.

Again there are numerous species of Pteropods in the tropical regions provided with calcareous shells of large size. These species gradually disappear from the surface as we approach the Arctic and Antarctic regions till the group is represented either by naked species or by nearly identical species of the minute thin-shelled *Limacina* in both the polar areas. Numerous other examples might be cited from other groups showing the close resemblance between the surface organisms of high northern and high southern latitudes.

The above instances of the very slight development of carbonate of lime shells and other carbonate of lime structures in the cold waters of the polar regions are instructive when recalled in connection with the massive coral reefs constructed in the polar regions in Palæozoic and even later geological times. The waters of these ancient oceans must have had a temperature of 65° or 70° F. at the poles, for it has been shown that the deposition of carbonate of lime is due to the secretion of carbonate of ammonia, one of the effete or waste products of marine animals, which, decomposing the soluble sulphate of lime in sea-water, produces insoluble carbonate of lime to form shells, its precipitation taking place with great difficulty and very slowly in cold water, but easily and very rapidly within the organism in water of a high temperature,[1] hence in the cold polar and deep-sea waters of our day no massive carbonate of lime shells or other structures are secreted by organisms.

Secretion of Carbonate of Lime.

The vegetation of the coal period implies over the whole globe an almost complete equality in the distribution of light and heat at that epoch. Marine species indicate the same uniformity. The Arctic Ocean was a coral sea in carboniferous times. A massive coral—*Lithostrotion*—is common to Europe, the United States, and the Arctic regions. *Productus semireticulatus* and *Productus longispinus* are found in the Andes of Bolivia

[1] See Murray and Irvine, On Coral Reefs and other Carbonate of Lime formations in Modern Seas, *Proc. Roy. Soc. Edin.*, vol. xvii. p. 90, 1889; see also *Proc. Roy. Soc. Edin.*, 1895, for paper on the Influence of Temperature on the Deposition of Carbonate of Lime.

and at a latitude of 82° N. in the Arctic.[1] The surface temperature of the sea could not well have been less than about 70° F., and the same temperature and the same marine fauna prevailed from equator to poles, the temperature not being higher at the equator. Flowering plants did not exist in the coal period. Flowers with vivid and brilliant tints only appeared in Mesozoic ages when for the first time the sun pierced the envelope of dense clouds that surrounded the whole earth. The atmosphere was less agitated then than now. In early Mesozoic times cooling at the poles and differentiation into zones of climate appear to have commenced, and temperature conditions did not afterwards admit of coral reefs in the polar area. But the colder and hence denser water that in consequence descended to the greater depths of the ocean carried with it a large supply of oxygen, and life in the deep sea became possible for the first time. There have been many speculations as to how a nearly uniform temperature could have been brought about in sea-water over the whole surface of the earth in early geological ages, as well as to how sufficient light could have been present at the poles to permit of the luxuriant vegetation that once flourished in these regions. The explanation that appears to me the most satisfactory is the one which attributes these conditions to the very much greater size of the sun in the early stages of the earth's history—an idea first introduced into geological speculations by Blandet,[2] who likewise discussed the relations of Arctic and Antarctic faunas—together with the greater amount of aqueous vapour in the atmosphere and the greater mass of the atmosphere.

Temperature of the Carboniferous Period.

The pelagic Algæ, Radiolaria, and Foraminifera above referred to are probably the but slightly modified descendants of a very ancient universal pelagic fauna and flora. Life in its simplest form most likely first appeared in Pre-Cambrian times in the detrital matters laid down about the mud-line, when the mud-line was generally not so deep, and the land-surfaces were more extensive than at the present time. From these simple forms, which would occasionally be carried into the superincumbent waters, the pelagic Protophyta and Protozoa, which peopled the surface-waters of the Pre-Cambrian ocean, were most probably derived. Radiolaria, and possibly also pelagic Foraminifera, have been discovered in Pre-Cambrian rocks.[3] From their remains being preserved in these rocks we may suppose that the Radiolaria were then even more abundant than in modern seas, and their skeletons appear likewise to have been more massive. Radiolaria and other silica-secreting organisms are much more abundant in those parts of the present ocean where there is a low salinity and where the surface is frequently affected by fresh water bearing the finest clayey matter in suspension. We have thus then a hint that the waters of the Pre-Cambrian ocean were probably not so

Pelagic Fauna and Flora of the Pre-Cambrian Ocean.

[1] Lapparent, Traité de Géologie, ed. 3, Paris, 1893, p. 884.

[2] *Bull. Soc. Geol. de France*, ser. 2, t. 25, p. 777, 1867–8.

[3] L. Cayeux, Sur la présence de restes de Foraminifères dans les terrains précambrian de Bretagne, *Comptes Rendus*, tom. cxviii., p. 1433, 1894.

salt as many regions of the present ocean, that they had a relatively high temperature and were probably frequently laden with fine clayey matter derived from the land and shallow reaches of the sea-bed, a condition of matters that now to some extent obtains in the western Pacific Ocean.[1] The great abundance of Protistan life in the open waters of the early ocean of which we have here some evidence, produced, in all likelihood, by death and decay a most abundant supply of food at the bottom of the ocean, especially just beyond the mud-line. In this position, again, the abundant food supply would bring about the most favourable conditions for the evolution of the Metazoa. Some species would eventually be able to spread upwards and establish themselves in the shallower portions of the sea-bed swept clear of mud by tides and currents. Even in these early ages species with pelagic larvæ, from being able to disperse more rapidly and to occupy all points of vantage, would ultimately be the successful competitors in these shallow reaches of the ocean.[2]

In the tropical and sub-tropical regions of the present ocean we find many large overgrown larval forms,—*Plagusia*, *Leptocephalus*, *Cephalacanthus*, *Phyllosoma*, *Alima*, *Erichthus*, *Arachnactis*, &c.—derived from the shore and shallow-water Benthos. These, having been carried by currents into the open ocean, and, not finding there the bottom conditions favourable for their further development, have grown to an enormous size. In some cases larvæ of this kind may have acquired the power of reproduction in their new habitat, somewhat after the manner of the Axolotl. Again, it is not difficult to imagine the pelagic Cœlenterates to have been derived from some such form as a Medusoid gonophore which, on being carried into pelagic waters, could not find the conditions necessary for the development of the fixed generation.[3] My late colleague, Professor Moseley, used to regard the pelagic animals as the original stock from which other marine faunas had sprung,[4] but evidence from embryology and other departments of research shows that there are better reasons for holding that all the highly organised pelagic animals are descended from ancestors which lived in the shallow waters surrounding the land, while the very ancient pelagic Protophyta and Protozoa were probably derived at a much earlier date from the simplest forms of life that originally appeared at the mud-line of Pre-Cambrian seas. The mass of individuals in the pelagic fauna and flora probably greatly exceeds that of other marine faunas, still the species are few when compared with the organisms of the shore and shallow water. Whales, seals, pelagic Fishes, *Halobates*, pelagic Cephalopods, *Ianthina*, *Scyllæa*, Pteropods, Heteropods, pelagic Crustaceans, Worms, and Cœlenterates, all appear to bear distinct traces of a

Pelagic Larvæ.

[1] See Buchan, Report on Oceanic Circulation, *Phys. Chem. Chall. Exp.*, pt. viii., pp. 3, 13, 1895.

[2] See W. K. Brooks, The Genus Salpa, Johns Hopkins Press, Baltimore, 1893, p. 123; also The Origin of the Oldest Fossils and the Discovery of the Bottom of the Ocean, *Journal of Geology*, vol. ii. p. 455, Chicago, 1894.

[3] See Agassiz, Three Cruises of the Blake, vol. i. p. 208.

[4] See *Brit. Ass. Report* for 1884, pp. 751–753.

shore and shallow-water origin. In polar waters a marked peculiarity of the tow-net gatherings is the almost total absence of pelagic larvæ belonging to benthonic organisms, and we know that many of the Echinoderms and other shallow-water animals of the Arctic and Antarctic regions are furnished with pouches in which the young are reared;[1] the same appears to be true of the animals living about and deeper than the mud-line in all parts of the world. In temperate zones where there is a wide range in annual temperature the pelagic larvæ of benthonic animals appear only in the spring or summer seasons; in the tropics they are present at all times in the surface waters. If there were once a nearly universal climate over the whole ocean, we may suppose that the same species of benthonic animals were nearly everywhere present in the shallow-water zones. When cooling at the poles set in, those animals with pelagic larvæ would be killed out or be forced to migrate towards the warmer tropics. By being able to limit the reproductive process to the summer season, some of these organisms with free-swimming larvæ have been able to live on in the temperate regions, but in the tropical and coral-reef regions we have the remnants of a once universally distributed shallow-water fauna. With the disappearance of this shallow-water fauna from the polar regions its place would be occupied by the organisms from the deeper mud-line, very few of which possess pelagic larvæ. In this way we may account for the identity or similarity between the polar marine faunas and floras, the great abundance of individuals and the relatively few species in the polar areas when compared with the tropical area, as well as the greater likeness of the shallow-water polar animals to deep-sea species. In like manner we may account for the disappearance of coral reefs from the west coasts of Africa and America and off Cape Guardafui, owing to the wide range of temperature in these positions from upwelling of cold deep water. Organisms derived recently from the mud-line animals here too occupied the shallow waters, and hence more closely resemble polar faunas than any other fauna within the tropics. From the general character of fresh-water species, and from the almost complete absence of free-swimming larvæ, we may suppose that the fresh-water fauna has also been chiefly derived from mud-line animals which ascended from the mouths of great rivers and from estuaries.

Origin of Marine and Fresh-Water Faunas.

The general similarity, and, in many cases, the identity of species of marine organisms in the Arctic and Antarctic regions, is a very remarkable fact, but probably not a more remarkable fact than that in the tropical regions there should be among benthonic animals hardly a marine species common to the east and west coasts of the continent of Africa, if we exclude some brackish-water and deep-sea species. The greater annual range and higher temperature, as well as the greater variety in the other conditions which obtain on either side of Africa, compared with those that obtain

[1] See Narr. Chall. Exp., vol. i. p. 379.

Benthos of the East and West Coasts of Africa and of the Polar Regions.

in polar areas, may be held to have produced a more rapid modification of species in tropical waters than would take place in the colder waters towards the poles, so that it may be urged that these faunas on the east and west coasts of Africa, notwithstanding their very distinct character, have not been separated from each other for so long a time as the polar faunas which more closely resemble each other. When we remember, however, that in the case of America the separation of the Atlantic and Pacific marine faunas is not so complete at the Isthmus of Panama as on either side of Africa, it may be assumed that the separation of marine faunas in the case of Africa is of much greater antiquity, possibly extending back to a time when there was a nearly universal climate all over the ocean. In the preceding extracts from Dr. Allman's Report[1] three different species of *Grammaria* are described from the Antarctic or Great Southern Ocean, each occurring in depths less than 100 fathoms in the same latitudes, but in widely different longitudes, viz., *Grammaria insignis* from Marion Island, *Grammaria stentor* from Kerguelen, *Grammaria magellanica* from Fuegia. A number of similar examples might be given from other widely separate points among Antarctic Islands and land-masses where a genus is represented by a different species in each area. This seems to show that these small land-masses in the Antarctic and Great Southern Ocean have been separated from each other for a sufficiently long time to have admitted of specific variations arising even in the cold Antarctic waters, and is consequently opposed to the view of a widely extended Antarctic continent, connecting all the other continents by their southern extremities, in recent geological times,[2] for, with such a wide extension of land in the southern ocean, we would rather look for very many circumpolar species, as in the northern hemisphere, where continuous coast lines have probably existed for immense periods of time in arctic and boreal latitudes.

Continental Land-Masses and the Distribution of Marine Organisms.

The distribution of the great continental land-masses appears, from what has been stated, and from other facts that might be adduced, to have a great influence on the distribution of marine organisms, both in shallow water and in the deep sea. It is abundantly evident that the land of the continents has been most unstable, and can in no way be regarded as permanent, during the course of geological history. Not only has the land been repeatedly torn down by denuding and disintegrating agencies, but the various strata have been repeatedly shoved above and depressed below the sea-level by those internal forces called into play chiefly by the contraction of the internal nucleus of the globe, from loss of internal heat through radiation into space. We may assume that the materials of the original crust were somewhat homogeneous in composition. The destructive and reconstructive processes here indicated, together with the action of organisms, have brought about

[1] See page 1443 *ante*.

[2] The Chatham Islands: their relation to a former Southern Continent, by Henry O. Forbes, *Royal Geographical Society, Supplementary Papers*, vol. iii., p. 607, 1893.

a very heterogeneous arrangement of the superficial portions of the earth's crust. In some regions sandstones and highly siliceous rocks prevail, in others limestones and clays with much iron and manganese. During the Challenger Expedition, particles of quartz were found to be almost wholly absent from the deposits towards the central portions of the ocean basins, but small quartz particles were found abundantly in all the terrigenous deposits laid down near the shore. As continental rocks are largely made up of free quartz particles, and all contain particles of quartz, it follows that they must have been formed from the deposits laid down near to pre-existing land. Rocks, made up in this way of terrigenous deposits, appear to have been again and again pushed up to form new land in the gradual evolution of the surface features of the planet, and to have been again and again torn down by atmospheric agencies, the various strata becoming more simple in composition, while the land masses, on the whole, have become more complex in structure at each revolution. Among the strata of the continents there are numerous examples of rocks which were apparently laid down in a deep sea, but a deep sea which must have been in more or less close proximity to some then-existing continental land. It is, on the other hand, extremely doubtful whether any continental rock has been laid down under physical conditions similar to those under which pelagic deposits are now being formed on the sea-bed beyond 300 miles from continental land. A broad distinction is to be drawn between *pelagic* and *terrigenous* deep-sea deposits. Quartz particles are almost wholly absent from the former, while they may make up 80 per cent. of the latter.

Terrigenous Deposits.

In the central parts of the Pacific and Indian Oceans there are in very deep water dark chocolate coloured deposits containing large quantities of iron and manganese, together with immense numbers of zeolitic crystals, small black spherules with metallic nuclei and other spherules of cosmic origin, great numbers of sharks' teeth and bones of whales, some of these latter belonging to extinct species. All these objects may be present as the nuclei of large manganese-iron nodules. At first I was inclined to regard the peculiarities of these deposits as being in some way due to hypogene action, but all these peculiarities may be better explained by regarding them as the results brought about by chemical changes on areas of the sea-bed where there has been an extremely slow rate of accumulation, and where all the materials of the deposit have for a long time been exposed to the action of sea-water. We now know that manganese can by successive deoxidations and reoxidations in, and at the surface of, marine deposits be transported on the floor of the ocean from coast regions to the central and deeper areas of the Ocean Basins.[1] Lime, iron, manganese, magnesia, and the alkalies seem to have accumulated in the ocean and in the abysmal deposits at the expense of

Pelagic Deposits.

[1] Murray and Irvine, On Manganese Oxides and Manganese Nodules in Marine Deposits, *Trans. Roy. Soc. Edin.*, vol. xxxvii., p. 740, 1894.

the rocks of the continents. The bases are being continually leached out of the rocks of the continents and carried away in solution, the result being the deposition of the greater part of the heavier materials in the abysmal regions, and the accumulation of the greater part of the lighter insoluble and refractory quartz on or near the continents. The average chemical composition of the pelagic or abysmal deposits shows only about 36 per cent. of silica, while that of the terrigenous deposits and continental rocks shows about 68 per cent. of free and combined silica. Continental rocks have an average specific gravity of about 2·5; the abysmal deposits would form rocks with a specific gravity of over 3·1. In the original superficial crust all the silica was probably combined with bases; the deeper layers would be more basic than the surface ones, but all the rocks of the crust were probably much less acid than granite. Gneisses and granites were probably formed subsequently to the commencement of subaerial denudation on the planet. Many considerations indicate that the continental masses are lighter portions of the Earth's crust. Pendulum observations indicate a deficiency of mass beneath the continents. The plumb-line along continental coasts tend, it is said, towards the ocean basins. The grand result of all the denuding and reconstructing agencies in the past appears to have been a great accumulation of quartz and highly siliceous materials on the present continental areas, that is, on the continents and the adjacent areas covered by terrigenous deposits, and this is possibly the chief reason why the average level of the plane of the abysmal regions lies at about three miles beneath the plane representing the average height of the continents.

Relative Permanence of Continental and Oceanic Areas.

If down to the close of Palæozoic times the ocean had throughout a nearly uniform high temperature, the deposits then formed in deep water would certainly be different, for reasons indicated above, from what we now find in the abysmal regions. It is most probable that the Ocean Basins were not so deep in these early ages, and numerous islands probably existed in them, with rocks similar to those that now make up the bulk of continental land. Possibly these former land-masses now form the submerged bases of the groups of oceanic islands wholly consisting, so far as we can see, of erupted rocks. In the gradual evolution of the surface features of the planet, continental land appears, on the whole, to have become more compact, more circumscribed and higher, while the ocean basins have become more shut off from each other and deeper. Continental land has been far from permanent, but there are many reasons for believing that the areas on the surface of the planet, within which the present continents are situated, are areas within which continents have been torn down and built up again since the dawn of geological history, while similar revolutions have not taken place in abysmal or pelagic areas of the Ocean Basins to anything like the same extent, and not at all during any of the later geological periods. In the evolution of the surface features of the globe and in the evolution of climate, as in the evolution of the solar system and in the evolution of organisms, there has been a progressive advance from simple to complex conditions, from states of more or less homogeneity to those of greater heterogeneity.

EXPLANATION OF CHARTS AND DIAGRAMS.

APPENDIX I.

CHARTS.

Chart 1A.—Hemisphere showing the Atlantic Ocean on Lambert's equal-area projection. } In pocket of
„ 1B.— „ „ Pacific „ „ „ „ } Cover to
„ 1C.— „ „ Indian „ „ „ „ } First Part.

These charts show the depths of the ocean so far as at present known. The positions of all soundings over 1000 fathoms are shown, except where so close together as to cause confusion, and are represented by the first two figures only, thus 24 stands for 2400 fathoms, 16 for 1600 fathoms, the last two figures being always omitted. *Basins* are areas of the floor of the Ocean surrounded by low marine ridges, *deeps* are areas where depths greater than 3000 have been obtained. The areas between the contour lines are marked out by different shades of blue on the ocean and different shades of brown on the continents and other land surfaces.

Charts 2 to 43 show the positions of the Sounding and Dredging Stations, nature of the Deposits, direction and force of the Wind and Surface Current, the following abbreviations and symbols being made use of:—

Figures enclosed thus, (37), indicate the position and distinguishing number of a Sounding, Dredging, or Trawling Station. Figures in block letter, thus, 2650, indicate the depth in Fathoms.

The letters under the depth indicate the nature of the Deposit at the bottom:—

gl. oz.	signifying	Globigerina Ooze.	r. m.	signifying	Red Mud.
pt. oz.	,,	Pteropod Ooze.	bl. m.	,,	Blue Mud.
di. oz.	,,	Diatom Ooze.	calc.	,,	calcareous.
rad. oz.	,,	Radiolarian Ooze.	s.	,,	sand.
r. cl.	,,	Red Clay.	m.	,,	mud.
crl. m.	,,	Coral Mud.	st.	,,	stones.
crl. s.	,,	Coral Sand.	sh.	,,	shells.
volc. m.	,,	Volcanic Mud.	g.	,,	gravel.
volc. s.	,,	Volcanic Sand.	crl.	,,	Coral.
gr. m.	,,	Green Mud.	h. g.	,,	hard ground.
gr. s.	,,	Green Sand.			

Arrows thus, , indicate the mean direction of the Wind, the number at the base giving the mean Force (in Beaufort's Scale). Arrows thus, , indicate the direction of the Surface Current, the numbers at the base giving the rate in miles per 24 hours.

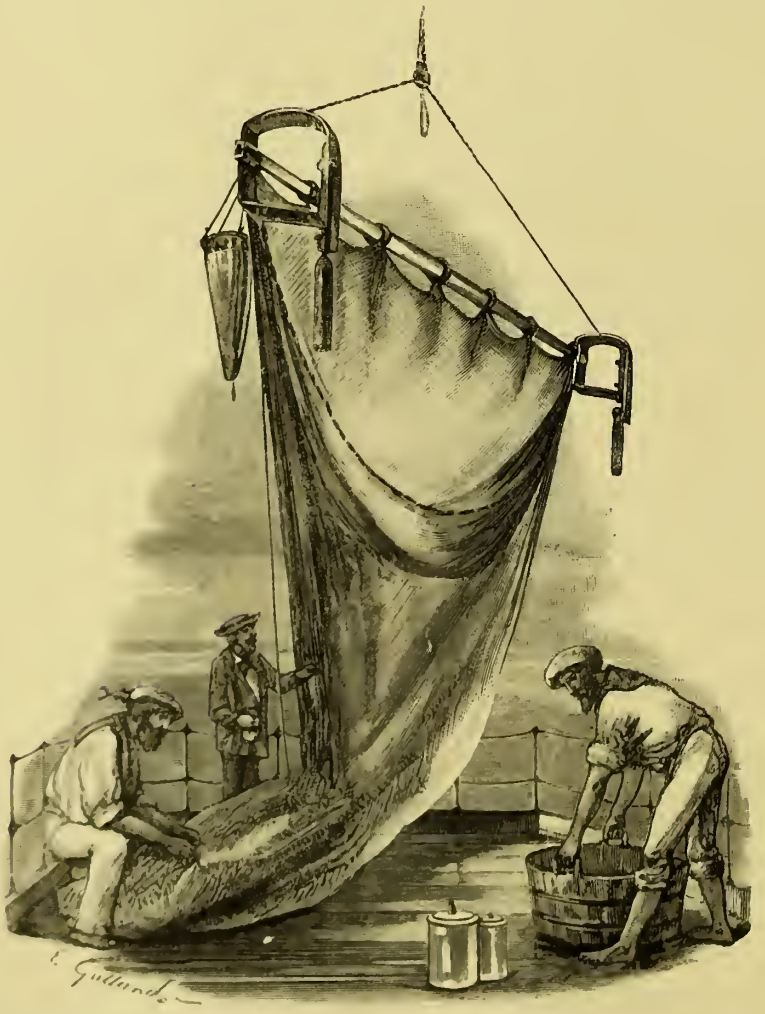
The position of the Ship each day at Noon is indicated by a black dot. When the position at noon corresponds with a Sounding Station the black dot is replaced by the number of the Station. The day of the month is noted in hair line, thus, 25, and occasionally the month and year are also given, the month being shown in Roman figures, thus, 1. V. 74.

DIAGRAMS.

Diagrams 1 to 22 show the vertical distribution of Temperature, the relief of the Bottom of the Sea, the nature of the Deposits, and the percentages of Carbonate of Lime. In these Diagrams horizontal lengths or distances from Station to Station are on a scale of 200 miles to the inch, and the depths are on a scale of 500 fathoms to the inch, so that depths or heights, as compared with horizontal distances, are exaggerated in the proportion of 400 to 1. In looking, therefore, at the Plan as one of the bed of the area, it must be remembered that the inclines as observed were 400 times less steep than they are repre-

sented. The Diagrams show the isotherms for every five degrees, which were obtained by plotting the temperature observations on paper of equal squares and drawing the curves (the observations and curves are published as Part III. of the Physics and Chemistry of the Expedition).

In the Diagrams the thick *Horizontal lines* represent lines of equal temperature in Fahrenheit Scale. The figures above each *Vertical line*, thus, $\frac{(37)}{2650\text{-}68}$, indicate, (37), the number of the Station, 68, the Surface Temperature, and, 2650, the Depth in fathoms. The figures below each *Vertical line* indicate the temperature at the Bottom, the type of Deposit being given with the percentage of Carbonate of Lime underneath.



Examining Contents of Trawl.

INDEX OF GENERA, SUB-GENERA, SPECIES, AND VARIETIES.

This index serves in a manner as an index of the species procured by the Challenger, described or referred to in the Zoological Reports, for on looking up the pages in the Station lists the reader will find references to the Zoological Parts in which the species are fully treated of.

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[1] See Report on Spirula, by Huxley and Pelseneer, appended to this Summary.

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H.M.S. Challenger, 1895.

"... *Last scene of all,*

Sans teeth, sans eyes, sans taste, sans everything."

—As You Like It.

NEILL AND COMPANY, PRINTERS, EDINBURGH.

THE

VOYAGE OF H.M.S. CHALLENGER.

A SUMMARY OF THE SCIENTIFIC RESULTS.

APPENDIX (ZOOLOGY, PART LXXXIII.)—REPORT ON SPIRULA.

REPORT

ON THE

SCIENTIFIC RESULTS

OF THE

VOYAGE OF H.M.S. CHALLENGER

DURING THE YEARS 1872-76

UNDER THE COMMAND OF

CAPTAIN SIR GEORGE S. NARES, R.N., F.R.S.,

AND THE LATE

CAPTAIN FRANK TOURLE THOMSON, R.N.

PREPARED UNDER THE SUPERINTENDENCE OF

THE LATE

Sir C. WYVILLE THOMSON, Knt., F.R.S., &c.

REGIUS PROFESSOR OF NATURAL HISTORY IN THE UNIVERSITY OF EDINBURGH

DIRECTOR OF THE CIVILIAN SCIENTIFIC STAFF ON BOARD

AND NOW OF

JOHN MURRAY

ONE OF THE NATURALISTS OF THE EXPEDITION

A SUMMARY OF THE SCIENTIFIC RESULTS

APPENDIX (ZOOLOGY, PART LXXXIII.)—REPORT ON SPIRULA.

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EDITORIAL NOTE.

A short time ago Professor Giard placed two specimens of the rare Cephalopod *Spirula* in the hands of Dr Paul Pelseneer for anatomical examination. From a study of these specimens, and with the assistance of Mr Huxley's figures and notes, Dr Pelseneer has been able to prepare the following important Report.

The figures contained in the six plates which illustrate this Memoir are copies of the drawings made by Mr Huxley in the course of his examination of the Challenger specimen of *Spirula*, and of that kindly lent him by Mr Agassiz.

Finding himself unable to carry out the work he had taken in hand to his satisfaction, Mr Huxley placed the plates at Dr Pelseneer's disposal, and gladly supplied him with such information as it was in his power to give.

Although Mr Huxley thinks that Dr Pelseneer has really been the sole author of the Memoir, he has, at Dr Pelseneer's desire, allowed his name to appear in the title.

This Report forms the eighty-third and last Part of the Zoological Series of Reports on the Scientific Results of the Expedition, and, owing to the delay in its preparation, could not be issued in one of the Zoological volumes. The manuscript in French was received by me from Dr Paul Pelseneer in January 1894, and was translated into English by Miss Annie Sclater.

John Murray.

Challenger Office,
45 Frederick Street, Edinburgh,
November 1894.

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THE

VOYAGE OF H.M.S. CHALLENGER.

ZOOLOGY.

REPORT on the Specimen of the Genus Spirula collected by H.M.S. Challenger. By the Rt. Hon. Thos. H. Huxley, F.R.S., and Paul Pelseneer, D.Sc. (Brussels).[1]

INTRODUCTION.

In the animal kingdom there are some exceedingly rare forms,—the number of observed individuals may be counted,—to which zoologists attach very great interest because of their phylogenetic importance; this arises either from their being the sole representatives of groups on the way to extinction, or because they permit us to form a better conception of the relations existing between groups which appear sharply separated from each other.

Spirula is one of these forms, and it is certainly of all Molluscs that which the best unites to the interest of rarity an aberrant conformation among the existing animals of its class: it is the only Dibranchiate with a multicellular, siphonated, and partially-external shell.

Rumphius is generally credited with being the first to observe a *Spirula*, and with having even given us some details as to its manner of life. From a consideration of the passage which he devotes to this genus [2] I am convinced that he saw only some very unimportant fragments (the adherent part of the last septum and the siphuncle); he believed the last chamber to be much larger, as in *Nautilus*, and he imagined that the cephalic part of *Spirula* remained fixed [see further on] to the rocks, the edges of the last chamber of the shell being supposed by him to be broken.

The first almost complete, though mutilated, specimen was collected by Péron and Lesueur, and from it Lamarck, who had created the genus for the shell (1799), first made known the existence of suckers.[3] Péron gave a rather unsatisfactory figure of

[1] See Editorial Note for statement as to the collaboration between the authors in the preparation of this Report. The Report was translated from the French by Miss Annie Sclater.

[2] Rumphius, D'amboinsche Rariteitkamer, 1705, pp. 67, 68.

[3] Lamarck, Encyclopédie méthodique, Atlas des Vers, Mollusques, Zoophytes, pl. 465, fig. 5, *a*, 1827.

this *Spirula*,[1] often reproduced, but this precious specimen disappeared without having been further studied.[2]

The English Expedition to the Congo procured a fragment of *Spirula* (the posterior extremity with the shell), which was deposited in the British Museum.[3] In 1836, several *Spirula*, not so complete as that of Péron, were taken by the French corvette "La Recherche,"[4] upon the most perfect of which the first anatomical sketch of the genus, by de Blainville, was based;[5] he recognised especially the existence of a single pair of gills. The first work of Owen[6] does not add much to the discoveries of de Blainville, his observations being likewise exclusively based on fragments.

A single specimen almost entirely intact had been collected at this time; it had already been figured by Gray[7] and by Reeve,[8] but it was only at a relatively recent period that the collector to whom it belonged would permit Owen to study its organisation. His memoir[9] is then the first description of a complete *Spirula*. Unfortunately, there are, in the text as well as in the illustrations of this work, not only a considerable number of important gaps, but a regrettable absence of even approximate precision, which render the results much less important than we would have expected, all the more so, as in the work there is a complete absence of the present ideas, tendencies, and pre-occupations of Zoology. This memoir has, however, remained the only one containing an anatomical description of a complete individual, for if Owen had the exceptional good fortune of dissecting a second complete *Spirula* (male), his observations were limited to making known, with as little precision, the sexual characters.[10]

Another complete individual was collected in 1865 near Port Jackson, but it was

[1] Freycinet, Voyage de découvertes aux terres australes, pl. xxx. fig. 4, Paris, 1816.

[2] "Malheureusement le seul et précieux spécimen qu'ils rapportèrent conservé dans la liqueur, et trouvé mort et flottant en mer, s'est perdu au Muséum, où ils l'avaient déposé, avant même qu'une bonne description put nous consoler de cette perte" (Férussac et d'Orbigny, Histoire naturelle des Céphalopodes acétabulifères, p. 55, Paris, 1848).

[3] Gray, Catalogue of the Mollusca in the British Museum, Part I., Cephalopoda antepedia, 1849, p. 116.

[4] Lettre de M. Robert sur les Spirules, sur le lamentin du Sénégal et sur l'existence dans cette région de l'Afrique de l'hyène tachetée (*Comptes rendus Acad. Sci. Paris*, t. ii., 1836, pp. 362, 363; *id.*, in *Ann. Sci. nat.* [*Zoologie*], ser. 2, t. v. pp. 226, 227, 1836).

[5] De Blainville, Quelques observations sur l'Anatomie de la Spirula et sur l'usage du siphon des coquilles polythalames (*Ann. franc. et étrang. d'Anat. et de Phys.*, t. i., 1837, pp. 369–382).

[6] Owen, Description of two mutilated specimens of *Spirula peronii*, with some observations on *S. australis* and *S. reticulata* (Zoology of the voyage of H.M.S. "Samarang," Mollusca, part i. pp. 6–17, pl. iv., 1848).

[7] Gray, On the Animal of Spirula (*Ann. Mag. Nat. Hist.*, ser. 1, vol. xv., 1845, pp. 257–260, pl. xv.).

[8] Reeve, Elements of Conchology, 1846, p. 16, pl. A, figs. *a–f*.

[9] Owen, Supplementary Observations on the Anatomy of Spirula australis, Lamarck (*Ann. Mag. Nat. Hist.*, ser. 5, vol. iii., 1879, pp. 1–16, pls. i.–iii.).

[10] Owen, On the External and Structural Characters of the Male Spirula australis, Lam. (*Proc. Zool. Soc. London*, 1880, p. 352, pl. xxxii.). Owen reports that this specimen was taken during the voyage of the "Bonite." Souleyet, however, who was on board this ship, says expressly that they had not succeeded in capturing a *Spirula* (Voyage autour du monde . . . sur la corvette la "Bonite," Zoologie, t. ii. p. 8, 1852).

deposited in the Sydney Museum,[1] and consequently could not be made the subject of anatomical research.

As to the complete *Spirula* taken by the "Blake" in the West Indian Seas[2] (represented in Pl. II. figs. 1, 2), it is, at the present moment, lost, without having been dissected. Therefore the capture, during the voyage of the Challenger, of an entire specimen of *Spirula*, which was entrusted to Professor Huxley, has been considered one of the happy zoological results of this Expedition.

From the above enumeration it appears that up to the present time only five complete individuals of *Spirula* have been under observation (not one of which was, however, taken alive), the two specimens (male and female) studied by Owen, that belonging to the Sydney Museum, and the two others which were collected by the Challenger and the "Blake."

In some public and private collections (notably in London) there are more or less important fragments of *Spirula* not mentioned in literature, but, like the specimen in the Sydney Museum, they cannot be made the subjects of scientific investigation.

However, two individuals—unfortunately also incomplete—were in the hands of former captain of the navy at Nantes,[3] who, still more strongly than the owner of the *Spirula* studied by Owen in 1879, refused to trust them to a Zoologist. But Professor Giard, who kept watch over these specimens, was able to acquire them on the death of their possessor; thanks to him these *Spirulæ* did not become the prey of a public collection. He has been so good as to entrust them to me and to permit me to dissect the larger and more complete of the two; upon this material my personal observations have been based.

Under these circumstances I have undertaken to prepare the Report upon the specimen of *Spirula* taken by the Challenger Expedition. Zoologists will join with me in regretting that this publication has not been made by Professor Huxley himself; but I shall be excused for supplying his place here, when it is known that for years past he had formally renounced the idea of publishing the figures already prepared, and thus these could not have been published without the intervention of a collaborator.

Professor Huxley has been good enough to furnish me with various explanations relative to the figures, and, with the aid of my own observations, I am able to present an anatomical description of *Spirula*, giving sufficiently precise details of the majority of the points of its organisation, in spite of certain deficiencies due to the rarity of the material and its state of preservation.

P. P.

[1] Angas, On the marine molluscan Fauna of the Province of South Australia, with a list of all the species known up to the present time, &c. (*Proc. Zool. Soc. London*, 1865, p. 157).

[2] Agassiz, On the dredging operations carried on from December 1878 to March 10, 1879, by the U.S. Coast Survey steamer "Blake" (*Bull. Mus. Comp. Zoöl.*, vol. v., 1879, p. 298); Agassiz, Three Cruises of the U.S. Coast and Geodetic Survey steamer "Blake" (*ibid.*, vol. xv., 1888, p. 61).

[3] These specimens had been collected in 1861, but their locality is uncertain. Professor Giard supposes that they had been taken in the Atlantic, in the neighbourhood of the Sargasso Sea (Giard, A propos de l'Animal de la Spirule, *Comptes rendus Soc. Biol. Paris*, sér. 9, t. v., 1893, p. 886).

OBSERVATIONS ON SPIRULA.

I. External Conformation and Teguments.

The body of *Spirula* is elongated, cylindrical, truncated posteriorly. The posterior extremity is constituted by a "terminal disk," which is less distinct in *Spirula peronii* (Pl. I. figs. 1–4) than in *Spirula australis* (Pl. II. figs. 1–3) and in *Spirula reticulata* (Figs. C, J, and N in the text); it carries two small fins, parallel to the median sagittal plane, between which is an orifice leading into a little fossa. In the posterior half there are, both dorsally and ventrally, two antero-posterior oval openings through which the last whorl of the shell very slightly projects. This "body" corresponds to the visceral sac, covered by the mantle, of *Nautilus* and of the Gastropods ("episoma," Huxley); the cephalo-pedal mass ("prosoma" or cephalopodium, Huxley) is united to the body by the "mesosoma" (Huxley), that is to say, by the nuchal region and the funnel, the latter (epipodium) belonging morphologically to the foot.

These different parts: head, foot (arms), funnel, mantle, &c., must be separately examined.

1. *Head.*—In the Challenger specimen this part was retracted into the pallial cavity (Pl. I. figs. 1, 2, 3) and a little distorted (Pl. I. figs. 5, 6). The "Blake" specimen (Pl. II. fig. 1) had also the head slightly twisted. This asymmetry is not normal, however, and has not been observed in other specimens;[1] it is apparently a deformation due to contraction. The head in its general conformation, like that of other Decapods, is characterised (in the Challenger and "Blake" specimens) by its rather considerable width, especially in the posterior part; it is more developed laterally than dorso-ventrally. The eyes are placed laterally, and behind them, but more ventrally, are found the olfactory organs (see further on for the conformation of these organs).

2. *Arms.*—As in all the Decapods, there are eight sessile arms, which are in *Spirula* rather short, and two long pedunculated or tentacular arms.

a. Sessile Arms.—The eight short arms are perceptibly equal in length (Pl. I. figs. 1–3); their aboral or external surface is rounded, except that there is a median longitudinal ridge. The internal face is flattened so as to form a surface for the acetabula, extending from the base to the summit of each arm; this surface is broad and bounded by a curved contour at the basal extremity and narrows gradually towards the summit. The bases

[1] For example, the individual studied by Owen in 1879.

of the arms are united by a very thin interbrachial membrane, which surrounds the buccal disk and does not carry suckers.

b. Tentacular Arms.—The tentacular arms were retracted in the Challenger specimen, but only partly and not completely as in *Sepia*, *Sepiola*, &c.; their acetabuliferous extremities bent back reach those of the sessile arms (Pl. I. fig. 1, *T.*). The free extremity of the "tentacles" is pointed, but not widened as in the other Decapods; the "suprabrachial" longitudinal ridge is there more elevated and more like a membrane than that upon the sessile arms. The remainder of the tentacular arms is rounded and smooth. The pocket in which each tentacle is in part retracted is formed by the interior of the base of the third and fourth sessile arms as usual, and when the retraction of the organ takes place, it is folded back on itself. In this position the tentacle resembles a bent arm, the proximal portion (attached) representing a very short arm, while the remainder corresponds to a long fore-arm with the acetabuliferous part at the extremity like a hand (Pl. III. T^1.). When the tentacular arms are thrown out and extended they are longer than the whole body (Pl. II. figs. 1, 2). The area on which the suckers are situated is in the form of an elongated oval, narrowed at the extremity corresponding to the summit of the arms, not exceeding one quarter of an inch in length; the suckers have the same form and arrangement as those of the sessile arms, the diameter of the largest not exceeding $\frac{1}{200}$th of an inch.

c. Suckers.—The suckers are "cups" slightly pedunculated; their peduncle is not, as in *Sepia*, inserted in the axis of the sucker, but laterally as in the Œgopsids, *Loligo*, &c. (see Pl. VI. fig. 10). The largest suckers are found at the proximal extremity (basal) of each acetabuliferous area, and do not exceed $\frac{1}{100}$th of an inch in diameter. They gradually diminish in volume up to the summit where their diameter is not more than $\frac{1}{250}$th of an inch. They are closely crowded over the whole surface of the acetabuliferous area, but without perfect regularity; six or seven of them occupy the width upon the largest part of the area, while there are not more than three or four at the base of the area, and not more than two or three at the summit. Their "horny" armature is thick, and in a few the form is that of a globular glass without bottom; the free annular border is produced into short spines (see Pl. VI. fig. 9).

3. *The Funnel, Muscles, and Cartilages.*—The funnel is closed ventrally, as in all the Dibranchiates. On the internal cephalic wall is a small anterior valve in the female (Pl. I. fig. 7, *I.v.*). This character also exists in the male.[1] There does not seem to be any trace of "Müller's organ" (mucous gland of the funnel) so widespread in the Dibranchiates. The infundibular collar (see Pl. I. fig. 5) is high and not fused to the mantle dorsally (Pl. III.). Ventrally, upon the sides of the collar, are linear, elongated, cartilaginous fossæ (Pls. I., II., and IV., *li.*) corresponding to the protuberances of

[1] Steenstrup, Sepiadarium og Idiosepius (*Vidensk. Selsk. Skr.*, naturhist. og math. Afd., ser. 6, Bd. i., Kjöbenhavn, 1881, p. 229).

the internal face of the mantle (Pl. II. fig. 1, *lpa.*), which form with these the resisting apparatus destined to insure the closure of the pallial chamber while the water is expelled through the funnel. The nuchal cartilage (Pl. I. fig. 5, *d. i.*) on the anterior dorsal margin of the "collar" in the median line has nearly the form of that in *Loligo*, and especially in the Ommatostrephidæ.

The retractor muscles of the siphuncle (Pl. IV. *l.mr.*) and of the head unite laterally, and have their common origin upon the external sides of the last chamber of the shell. The retractile part of the head of these latter muscles is inserted upon the aboral face of the perineural or cephalic cartilage, which forms a capsule enveloping the nervous centres. This cartilage sends, upon the sides, vast prong-like prolongations (Pl. V. fig. 3, *pa.ct*^{4}.) supporting the optic ganglia, and ventrally, in front, the median projection (Pl. V. fig. 3, *pa.c*^{5}.), which (as in *Sepia*) gives attachment to the muscles of the arms. In front, the cartilaginous capsule is continued by the envelope of connective tissue of the junction between the pedal and brachial centres.

4. *Mantle.—a. Pallial Envelope.*—The external surface of the mantle is smooth, as in the other Dibranchiates; the reticulation observed in the form called *Spirula reticulata* does not belong to the superficial portion of the integuments, as will be seen later on.

The border of the mantle, free all round its circumference, offers three anterior protuberances: a median dorsal one, and two symmetrical latero-ventral ones, which limit the "sinus" of the funnel (Pl. I. figs. 2, 3; and Fig. C).

In the Challenger specimen the external surface of the mantle was deprived of its epidermis, and, for the greater part of its extent, of the layer of chromatophores.[1] The chromatophores, however, were present at the aboral extremity (Pl. VI. fig. 14), where the skin was not removed, as well as upon a narrow band of the internal face of the mantle along the margin at this place. The "Blake" specimen was in this respect in the same condition, the chromatophores being preserved only at the aboral extremity (Pl. II. figs. 1, 2) and along the margin of the mantle on the internal face (Pl. II. figs. 1, 2, *cr.*).

The chromatophores are nevertheless spread over the whole external surface of the mantle.[2] In fact there exists in the form called *Spirula reticulata* a general reticulation of this surface given as a character of that form, and due, from what I have seen, to bundles of subcutaneous fibres disposed in such a manner as to form more or less regular polygons.

However, these polygonal spaces with definite limits exist also in an Ommatostrephid, *Illex coindeti*, where on taking away the pallial epithelium, an appearance is observed very similar to that presented by *Spirula reticulata*, and the polygonal spaces are there occupied by chromatophores. In *Illex* it is especially near the free margin of the

[1] It is probably this state which led von Willemoes-Suhm to suppose that the specimen had been swallowed by an abyssal fish and regurgitated when brought to the surface by the trawl.

[2] The coloration of the dead specimens, but freshly taken from the water, is yellowish-white spotted with brown, according to Robert (*Comptes rendus*, t. ii., 1836, p. 362).

mantle that these spaces have the limits well marked. In *Spirula reticulata*, the reticulation is also more definite in this region as well as near the opening of the shell, where the polygons are more irregular (Fig. A in the text), whilst the projections of the reticulum vanish insensibly on the edges of these openings.[1]

From without inwards the mantle presents (besides the epithelium and the layer of chromatophores): first, a layer of connective tissue, dense and glassy superficially, and looser below; second, a thin layer of longitudinal muscular fibres; third, a thick layer with circular muscular fibres, traversed by radiating muscular bundles (Pl. VI. fig. 14); fourth, another thin layer of longitudinal muscular fibres; and fifth, the subcutaneous connective tissue of the internal face.

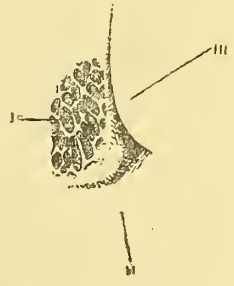


Fig. A.—Posterior part of the right side of the mantle in *Spirula reticulata*, ventral view; × 10. i, reticulation of the mantle; ii, terminal disk; iii, shell.

At the aboral part the form and the aspect of the mantle are modified by the presence of the shell, elsewhere almost entirely covered; there is on both the dorsal and ventral faces only one longitudinal opening, in the form of an elongated ellipsoid, limited posteriorly by the "terminal disk." By these openings (the dorsal is the larger) the last whorl of the shell makes a slight prominence (Pl. I. fig. 1, *sh.*). The external portions of the mantle are secondarily-acquired formations, which are almost totally wanting in *Nautilus* and most Gastropods. The mantle, properly so-called, is the little convex part of the wall of the shell cavity, that is to say, the envelope of the little visceral sac lodged in the terminal chamber of the shell (Pl. III. P^7.); it is that envelope which is the true secreting surface of the shell.

This little visceral sac corresponds to the visceral hernia of *Nautilus* and of the Gastropods, but does not include more, however, than the posterior half of the lobes of the liver (Pl. III.); it is continued backwards by the membranous siphuncle (Pl. V. fig. 1, *sphm.*) piercing all the septa of the shell, through the siphonal tubes of the shell (*sph.*) secreted by it.

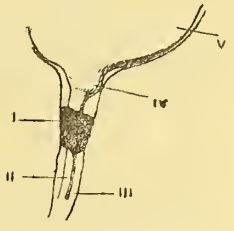


Fig. B.—Anterior part of the siphuncle of *Spirula reticulata*, left hand side view; magnified. i, muff of the last segment of the membranous siphuncle; ii, membranous siphuncle; iii, shell-siphuncle; iv, anterior widening of the siphuncle; v, mantle.

The proximal portion (quite anterior) of the siphuncle is much enlarged in *Spirula reticulata* (Fig. B, iv). At the level of the septum the siphuncle does not present any sensible constriction. The portion enclosed in the last chamber but one (consequently in the last segment of the shell-siphuncle) was surrounded, in the *Spirula reticulata* studied, by a thick muff of a hard substance, recalling by its aspect and consistency the ligament of certain Lamellibranchs; this muff hermetically filled the space between the pallial siphuncle and the wall of the shell-siphuncle (fig. B, i).

[1] The *Spirula* "*australis*," examined by Owen in 1879 (*Ann. Mag. Nat. Hist.*, ser. 5, vol. iii. pl. i. fig. 2), appears also to present a reticulation of the integuments; this character will not then be special to *S.* "*reticulata*."

The surface of the little visceral sac (the mantle consequently) is reflected above the opening of the shell, passes into the wall of the "episoma" closely attached to it (separated by a space in Pl. V. fig. 1), and evidently secreting (upon the median line) the "band of thickening" (Pl. II. fig. 7, *b*). The mantle thus forms a shell cavity, closed on all sides except at two opposite points, the dorsal and ventral openings of the shell, by which the portions of the last whorl of the shell make a free projection outside.

These shell openings, in short, form an absolutely natural disposition, although in the Challenger specimen, where the integuments of this region were considerably altered, the margins of the openings appeared to be fixed and to have thus sent short irregularly-cut prolongations over the shell (Pl. I. figs. 1, 3); in *Spirula australis* (Pl. II. figs. 1, 2), and in *Spirula reticulata* (Fig. C in the text), this margin is perfectly complete and uniform, and there is no portion of the integument, however thin this may be, which passes over the shell, contrary to the opinion of Steenstrup[1] and Owen, according to whom the periostracum (shell epidermis) was *continuous with* the epithelium of the margin of the pallial openings.[2] As one might expect, this last assertion is absolutely incorrect. This periostracum is continuous under the mantle over the whole surface of the internal portions of the shell, and it is in no way a cellular tissue.

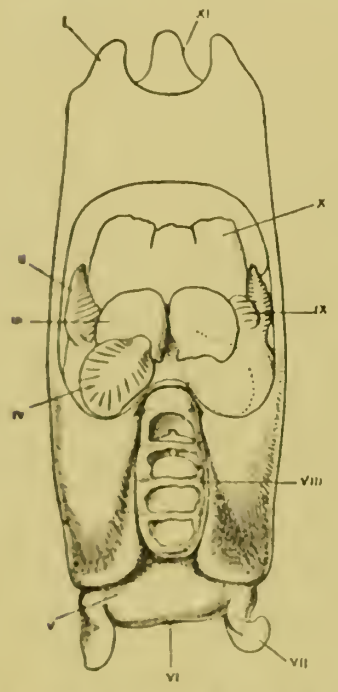


FIG. C.—*Spirula reticulata*, with the pallial cavity laid open, ventral view; × 4. I, ventro-lateral projections of the edge of the mantle; ii, gill; iii, accessory nidamental gland; iv, nidamental gland; v, terminal disk; vi, aboral fossa; vii, left fin; viii, external ventral part of the shell; ix, oviduct; x, retractor muscle of the infundibulum; xi, dorsal projection of the mantle edge.

In front and upon the sides, the wall of the shell sac is formed by the thin "peritoneal" membrane, which constitutes the external envelope of the viscero-pericardial cavity (completely separated from the shell sac); posteriorly it is formed by the terminal disk. Internally the shell sac is limited by the little mantle, properly so-called (see above), and by its continuation, the siphuncle (Pl. V. fig. 1, *sphm.*), extending as far as the first chamber.

Upon the wall of the shell sac are inserted laterally: in front, the retractor muscles of the branchiæ (which on parting from the branchia are at first transverse, then directed posteriorly); behind, the muscular bundles of the fins.

b. Terminal Disk.—The terminal disk is fleshy and covers the most aboral parts of the shell with a thick layer of tissue limited all round by a superficial furrow more or less

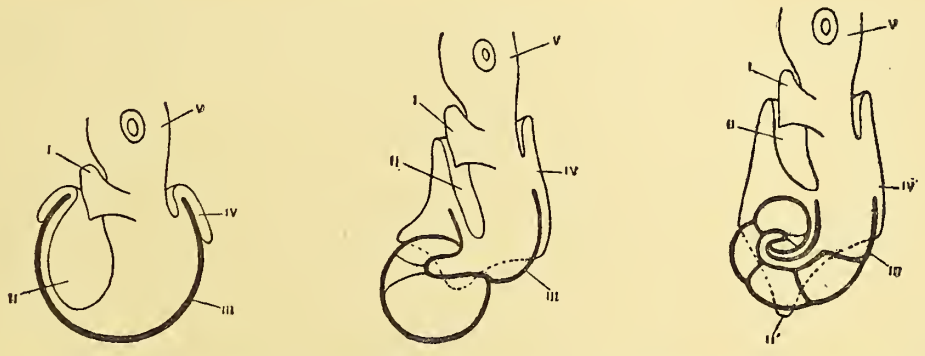
[1] Steenstrup, *op. cit.*, p. 227: "Shell distinctly covered dorsally and ventrally, where the skin grew thin above it."

[2] Owen, *Ann. Mag. Nat. Hist.*, ser. 5, vol. iii. p. 3.

deep (Pl. II. fig. 1 ; and Figs. C, I, N in the text). However, in the Challenger specimen, the terminal disk, although as thick (Pl. III., P^3), is less distinct from the rest of the mantle (Pl. I. figs. 1–6) than in the two other forms, the furrow above mentioned being in it almost indistinguishable.

This disk is laterally continuous with the rest of the mantle ; ventrally and dorsally it limits aborally the shell openings. However, in Professor Giard's smaller specimen (*Spirula reticulata*) this lateral continuity with the mantle does not extend over so great a space as in the larger specimen ; the shell openings are there consequently proportionally longer.

Thus in the adult the shell tends to become still more internal than in the young. On the other hand the three forms (*Spirula australis*, *Spirula reticulata*, and *Spirula peronii*) all show an increasing gradation in the encroachment by the mantle on the shell, the minimum dorso-ventral extension of the aboral disk being found in *Spirula australis*,[1] corresponding to the maximum length of the shell openings and



Figs. D, E, F.—Three schemes of supposed developmental stages of *Spirula*. D, in the embryonic shell ; E, with a bilocular shell ; F, with a quinquelocular shell.—i, infundibulum ; ii, pallial cavity ; ii′, terminal disk ; iii, shell ; iv, mantle ; v, head.

the maximum of extension of that disk ; in *Spirula peronii* (Pl. I. fig. 4) it is more completely fused with the rest of the mantle, and at the same time the shell openings there are smaller than in the two other forms, *Spirula reticulata* (Figs. C, J, N) being in this respect intermediate between *Spirula australis* and *Spirula peronii*.

It is necessary then to suppose that, in the process of development, the free margins of the mantle are reflected over the shell, as in numerous Molluscs (and especially over the dorsal side of the shell in *Nautilus*), since the shell has gradually become more and more covered (Fig. E). The right and left sides of the mantle evidently must send, towards the aboral extremity, prolongations which have united over the median line, giving rise to the terminal disk, which was apparently of small extent at first (Fig. F).

It must not be supposed that the shell might have been completely enclosed at a very early stage, and that the dorsal and ventral openings of the shell cavity might have been

[1] Owen, *Ann. Mag. Nat. Hist.*, ser. 5, vol. iii. pl. i. fig. 3.

formed later by the pressure of the shell upon the thinnest points of the pallial envelope; it is solely on account of this pressure that the mantle has not completely closed and that the openings have therefore persisted. The development of the shell sac of other Cephalopods (*Sepia*, *Loligo*) takes place in an essentially similar manner, except that the edges join not only in one part but throughout their whole length.

The terminal disk is remarkable for the organs which it carries: Fins and Aboral Fossa.

α. *Fins.*—The fins are relatively small, rounded, almost semicircular, longer in the "dorso-ventral" direction than in the cephalo-caudal (Pl. I. fig. 1; Pl. II. fig. 2; Fig. J in the text). Their muscular mass is not attached to the cartilaginous supports, as in the other Decapods, the fibres being inserted directly on the shell sac. The fins of *Spirula* are characterised by their direction and situation.

* *Direction.*—The fins are parallel to the median sagittal plane, inserted to the right and left of the terminal disk, and not arranged in the same right and left horizontal plane as is the case with other Dibranchiate Cephalopods; they are thus to the fins of other Dibranchiates much as the tails of fishes are to those of Cetaceans.

** *Situation* at the posterior part of the body.—In the Cephalopods which have been most generally studied (*Sepia*, *Loligo*, &c.), the fins extend in the direction just indicated along a rather considerable length of the sides of the mantle. Nevertheless the disposition presented in *Spirula* cannot be considered as a state of reduction or of retrograde development. In fact in *Nautilus*, where the shell is quite external, there are no fins. In the Œgopsids, such as *Ommatostrephes*, the most archaic of living Dibranchiate Cephalopods, the two fins are at the posterior extremity, attached side by side on the median dorsal line (where they cannot be attached in *Spirula*, on account of the opening of the shell cavity), and do not extend so far forward as in the other Decapods, in which the line of attachment is by degrees removed from the median dorsal line (*Loligo*) towards the sides where the fins extend over a greater and greater length (*Sepioteuthis*, *Sepia*). On the other hand, in the development of Decapods with long fins (*Loligo*, *Sepia*), as well as in the others, these organs are found originally situated at the aboral extremity, as in the adult *Spirula*, and are there separated by a space of greater or less extent (Figs. G, H). *Spirula* thus presents the most primitive state of the fins of Cephalopods.

β. *Aboral Fossa.*—Between the two fins in the middle of the terminal disk is found a rounded opening (Pl. I. fig. 4; Pl. II. fig. 3), which in Professor Giard's specimen appears rather elongated across (apparently by deformation, see Fig. I in the text).

This opening leads into a cavity of greater diameter than that of the orifice (Pl. II., *fs.*; Pl. VI. fig. 14). This cavity is occupied by a conical papilla, the summit of which in certain individuals projects a little to the outside (Pl. VI. fig. 14). This papilla presents a peculiar structure, but the state of preservation of the two specimens studied unfortunately prevents a very detailed description. The two figures relative to this

structure (Pl. VI. figs. 14 and 15) are made from the Challenger specimen ; Professor Giard's specimen showed the same conformation except that the papilla in it was less voluminous.

The base of the conical papilla is formed by a lenticular body of fibrous tissue (Pl. VI. fig. 14, *l*) presenting nuclei among the fibres (Pl. VI. fig. 16). A layer of bright glassy-looking substance (Pl. VI. figs. 14 and 15, *m*), resembling the elastic tissue of Vertebrates, covers the aboral surface of the lenticular body, and extends over the whole central mass of the papilla, which it thus bounds ; this layer appears to become thin near the summit of the papilla, but it must be remembered that in the two individuals studied this summit was very much damaged.

Finally, a layer of fibres, very probably muscular, radiates, in front of the lenticular body, from the centre to the periphery (Pl. VI. figs. 14 and 15, *r*).

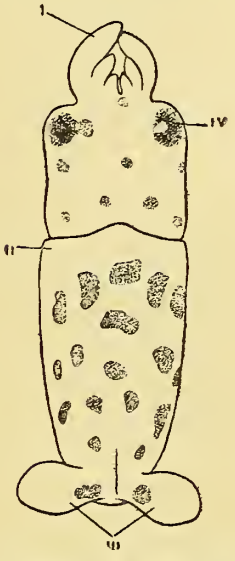


FIG. G.—Embryo of *Loligo*, dorsal view ; magnified. i, arms ; ii, mantle ; iii, fins ; iv, eye.

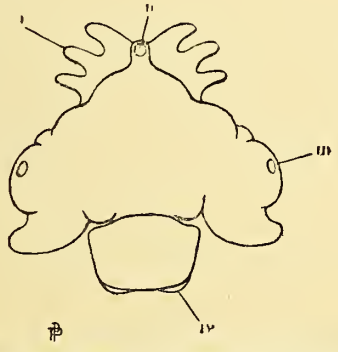


FIG. H.—Embryo of *Sepia*, dorsal view ; magnified. i, arms ; ii, mouth ; iii, eye ; iv, fin.

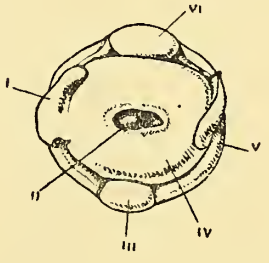


FIG. I.—Aboral view of *Spirula reticulata* ; ×2. i, left fin ; ii, aboral fossa ; iii, ventral external part of the shell ; iv, terminal disk ; v, mantle ; vi, dorsal external part of the shell.

Function of the Fossa.—The conformation of this organ has remained unknown up to this time, though various authors have expressed the opinion that it is an adhesive apparatus, founded on a supposed observation of Rumphius, according to whom "*Spirula* attaches itself to rocks *by its terminal disk.*" Now Rumphius makes no mention of the terminal disk nor of the fossa (*op. cit.*, p. 68), nor indeed of any other external part of *Spirula*. It is certain, as I have already pointed out, that if he saw any parts they were only very unimportant fragments. According to his obscure text one must conclude that he believed that *Spirula* fixed itself to rocks by the mouth ; he knew the siphuncle and the immediately adjacent parts, contained in the last chamber of the shell, and he supposed that the siphuncle traversed the whole animal, which fixed itself by the oral extremity

with the aid of this little organ. It is now necessary to abandon this idea, for there is no evidence that *Spirula* fixes itself by its aboral extremity.

There is besides nothing in the fossa and its papilla which recalls the structure of an acetabulum or sucker, especially there are no retractile muscles at the bottom of the cavity. Nor is this fossa a mucous pore, as other authors have supposed; there is no trace of special glandular apparatus. Its functions still remain very problematical. One might perhaps suppose that the papilla is a protective prominence; we know that owing to the rapid swimming of Cephalopods, being retrograde, their aboral extremity is much exposed. And *Spirula*, having a well-developed funnel, is organised for swimming backwards, like the other Dibranchiates, and its terminal papilla has

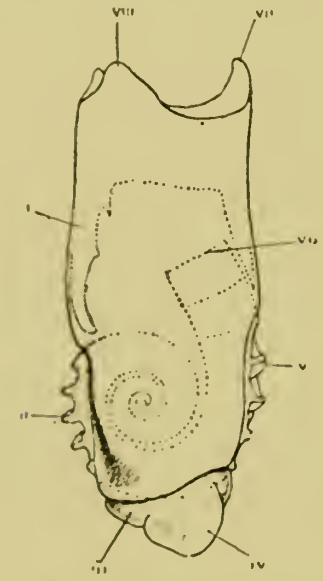


FIG. J.—Left view of *Spirula reticulata* (the internal part of the shell and the visceral sac represented by broken lines); × 2. i, pallial cavity; li, ventral external part of the shell; iii, terminal disk; lv, fin; v, dorsal external part of the shell; vi, last septum; vii, dorsal projection of the mantle edge; viii, ventro-lateral projection of the mantle edge.

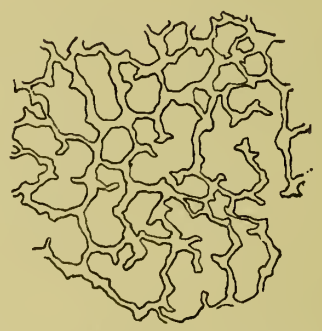


FIG. K.—Part of the external face of the shell of *Spirula*; × 90.

precisely the situation of an organ of protection for the aboral extremity. In the majority of Decapods this situation is occupied by the point of the rostrum. Still, on the hypothesis that in the living animal this papilla would be covered by a small external shell, it does not appear that one could see in this the homologue of the rostrum of the Decapods, since the latter is formed in the shell sac.

c. Shell.—The shell of *Spirula*, being very common, can be easily studied, and is well known to zoologists. Therefore it is not proposed to dwell on this subject, except in so far as concerns the relations of the shell to the animal.

In the adult it is as we know multicellular, siphonated, and rolled like a spiral, in a

median sagittal plane, but it is necessary to notice that this rolling-up is ventral or "endogastric."[1] The greater part of the shell is covered by the mantle, except at the two orifices indicated above. In *Spirula reticulata* (Fig. J) the shell extends further forward, under the integuments, than in *Spirula peronii* (Pl. III.), the three last septa being hidden.

The shell is entirely covered by a periostracum continuous over the whole surface. The external face of the shell is not smooth, as in the majority of internal shells, but irregularly reticulated (Fig. K) in *Spirula peronii*, *Spirula reticulata*, and in all the dry shells I have been able to examine (in the mesh of this reticulum is another slighter reticulation formed by a fine broken line). On the last whorls this reticulation is not recognisable except upon a little more than the half of the convex face. On the concave face, especially in the first portions of the spire (Pl. II. fig. 7), there is a median external band of thickening.

The *septa* have a curved surface, with the convexity directed towards the summit of the spire (Pl. II. figs. 5, 6). Their structure shows that they are attached to the internal face of the shell by a thin margin directed forwards. They are therefore distinct formations, but it is scarcely probable that they are much more recent than the portions of the shell to which they are immediately adjacent, for in the specimen of *Spirula reticulata* studied, the last chamber was, so to speak, without depth (see Fig. J, vi); the septum was then formed near the free margin of the shell. At the level of the first septum a constriction is observed (Pl. II. fig. 7), less and less marked further on, which leads one to suppose that during the first stages of its existence the successive openings of the shell were somewhat narrowed.

The *initial chamber* is spherical with a larger diameter than those which immediately follow.[2] This "apical chamber" is the true primitive embryonic shell; it follows from its form that the young *Spirula* had (as is likewise observed in the earliest stages of Dibranchiates) a spheroidal visceral mass (episoma) with a complete external shell (see Fig. D). The form and the relations of the shell to the mantle must only have been changed later on, with growth, after the manner indicated by the figures D to F above.

The *siphuncle* is situated on the concave side ("ventral" for the later chambers) of the shell, and attached to the wall of that side (Pl. II. fig. 7). The various segments (portions comprised between two successive septa), especially in the last whorls, are inflated in the half turned towards the opening (Pl. II. fig. 5; Pl. V. fig. 1). Each segment is directly continuous with the septum which is "anterior" to it (that is to say, formed after it) or situated nearer the opening (Pl. II. fig. 5). The septa do

[1] The other Molluscs with rolled-up univalve shells present, when they have not undergone torsion, a dorsal or "exogastric" rolling up, *e.g.*, adult *Nautilus*, embryonic *Patella* and *Fissurella*.

[2] Certain authors call it "ovisac"; it exists not only in other Dibranchiates (Belemnitidæ, &c.), but also in the Ammonites.

not present siphonal necks, but each segment of the siphuncle is joined to the subsequent one (that which is formed after it) by a sort of "cogwheel," more or less regular, which is found at the aboral extremity of the former, spreading a little over the concave surface of the septa (Pl. II. figs. 4 and 6), and thus preventing the penultimate chamber from communicating with the siphonal cavity.[1] The apical extremity of the siphuncle is a cæcum making a small prominence in the interior of the initial chamber (Pl. II. fig. 7, *psph.*); from this cæcum a sort of ligament, situated in the median sagittal plane, runs, while enlarging, to the wall of the initial chamber (prosiphonal ligament or "prosiphuncle," Pl. II. fig. 7, *c.*). We can only make conjectures as to the nature and function of this "ligament." But it evidently cannot have had the function of siphuncle in the embryo;[2] the embryo with a single chamber cannot have had any kind of siphuncle, and from the formation of the second chamber the true siphuncle was constituted.

The fact that in our *Spirula reticulata* the last chamber is so shallow renders it probable that the increase of the shell-siphon is intermittent, and that each segment of the siphuncle does not originate much before the septum which is topographically anterior to it.

d. Pallial Cavity.—The pallial cavity is widely open, the margin of the mantle not being at any point united to the cephalopedal mass. But it is considerably less deep than in the other Dibranchiates; the presence of the shell prevents its extension on the median line (Pl. I. fig. 6; Pls. III. and IV.), and even on the sides it does not extend very much further (Pl. IV. figs. 1 and 3, *a*). In *Nautilus* likewise the pallial cavity does not extend so far backwards as in the other Cephalopods. Upon the "visceral" face of the pallial cavity, at the very posterior extremity, are found (in the female) the nidamental glands (Pl. I. fig. 6, *n.g.*, &c.). In front, and partially concealed by the anterior extremity of these glands, are glandular prominences (Pl. I. fig. 7, *x*; Fig. C in the text, iii), apparently accessory nidamental glands (see further on, Reproductive System); the left one partly hides the extremity of the oviduct (Fig. C, ix). In *Spirula peronii* and *Spirula australis* (Pl. I. fig. 7; Pl. II. fig. 1) the anus opens between these two prominences on the level of their anterior margins, whilst in *Spirula reticulata* it, as well as the two neighbouring sessile renal openings (Fig. R), is hidden on the median line behind these two prominences, which are almost in contact; between the two prominences there is seen, beneath the integuments, the ink bag (Figs. C and R, iii). The glandular extremity of the oviduct projects between the left gill and the glandular prominence, behind which it sinks and opens obliquely (Fig. R, vii).

The *gills* are situated quite laterally (Pl. IV. fig. 3, *br'*), less ventrally than in other Cephalopods. They are relatively small, and present about twenty-five pairs of leaflets.

[1] The remarkable radiating structure of the siphuncle of certain palæozoic Cephalopods is perhaps comparable to it.

[2] Munier-Chalmas, Sur le développement du phragmostracum des Céphalopodes et sur les rapports zoologiques des Ammonites avec les Spirules (*Comptes rendus*, t. lxxvii., 1873, p. 1559).

Their axis rises between the nidamental glands, properly so-called, and the accessory glands. These organs are retained at the internal face of the mantle at the dorsal side of their axis, by a support ("pallio-branchial ligament," Pl. I. fig. 6, *pb.*), upon which no "spleen" or blood-gland is to be observed. In front of the branchial support, and more ventrally, the internal face of the mantle shows a lateral cartilaginous prominence ("button" of the resistance apparatus); an elongated prominence of the same appearance exists (at least in *Spirula reticulata*) on the dorsal side of the internal face of the mantle, on the median line, anteriorly, opposite to the middle of the infundibular collar.

II. Nervous System.

As in all Cephalopods (including *Nautilus*) the central nervous system is situated around the œsophagus behind the buccal bulb (Pl. III.), and, as in the Dibranchiates, this nervous system is contained in a cartilaginous capsule (Pl. V. figs. 1, 3), which was treated of above.[1]

Setting aside the enormous optic ganglia (Pl. V. fig. 2, *o.g.*), which occupy the right and left sides of the central nervous mass, we recognise in this last the following ganglia:—(A) One pair of supra-œsophageal: cerebral ganglia (Pl. V. figs. 1, 2, 3, *g.c.*), and (B) three pairs infra-œsophageal: (*a*) anterior: brachial ganglia (*g.p'.*); (*b*) median: pedal ganglia (*g.p.*); (*c*) posterior; pleuro-visceral or "chlamydo-splanchnic" ganglia (*g.ch.s.*).

Besides, it is necessary to distinguish still another little pair, anterior supra-œsophageal, called "superior buccal" (*s.b.g.*), far removed from the cerebral centres, as in the Œgopsids (Fig. L, ix), although in the Sepiidæ they are very much nearer, and in the Octopods they are fused with them, forming the anterior part.[2]

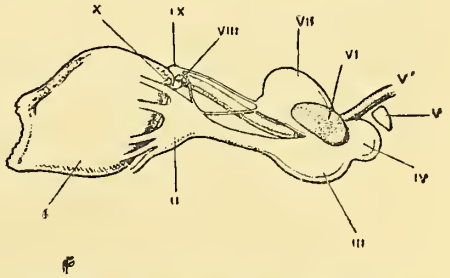


Fig. L.—Central nervous system of *Ommatostrephes pteropus*, left hand side view; magnified. i, buccal mass; ii, brachial ganglion; iii, pedal ganglion; iv, pleuro-visceral ganglion; v, posterior salivary glands; v', œsophagus; vi, section of the optical nerve; vii, cerebral ganglion; viii, stomato-gastric ganglion; ix, "superior buccal" ganglion; x, anterior salivary gland, uncovered.

These "superior buccal" ganglia are united to the cerebral ganglia by long connective cords; in the Challenger specimen the left connective cord shows the peculiarity of being double (Pl. V. fig. 2).

The connective cords uniting the superior buccal ganglia to the brachial centres have not been seen and have probably escaped notice; but the cerebro-brachial cords have been observed and are rather long (Pl. V. fig. 4, x).

[1] Ventrally and laterally the central nervous system is surrounded and separated from the cartilage by a glandular looking substance (Pl. III., *ad.*, and Pl. V. fig. 1), as in other Dibranchiates (where it is called "white body"), the microscopic examination of which suggests that it is a blood gland.

[2] The facts that this segmentation of cerebral centres exists in a form so archaic as *Spirula*, and that the superior buccal ganglia resulting therefrom are very far removed from the cerebral ganglia properly so-called, prove that the disposition presented by the Octopods is not the primitive one.

These are the only connective cords visible externally, the others (cerebro-pedal : *cpc.*; cerebro-pleural : *cchc.*; pleuro-pedal : *pchc.*) being hidden under the cellular coating of the centres. It is true, however, that the shrunken part binding together the brachial and pedal ganglia, which are far apart from one another, may be called the brachio-pedal connective cord, as in the Œgopsids. But these brachial centres (innervating the arms by their anterior part) and pedal centres (innervating the funnel by their postero-ventral part) only constitute a single pair of ganglia as has been already proved by the development.[1]

In the pleuro-visceral centres should be distinguished :—

A. The pleural (lateral), from which arise the pallial nerves (*pl.n.*);[2] and

B. The true visceral ganglia, from which arise the visceral nerves (Pl. III. and Pl. V., *v.n.*).

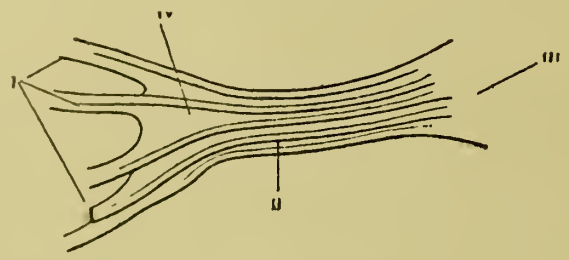


Fig. M.—Pedo-brachial connective of *Ommatostrephes pteropus*; left-hand side view, magnified. i, brachial nerves; ii, part of a brachial nerve coming from the pedal ganglion ; iii, pedal ganglion ; iv, brachial ganglion.

These latter nerves, which arise separately (Pl. V. fig. 2, *v.n.*), could not be followed in *Spirula peronii*. In *Spirula reticulata* it has been shown that they are closely united (Fig. S, xi) to the back of the anus, in the same manner as in the Œgopsids, and not by a long "commissure" as in *Sepia*. They do not, however, at their point of junction form a true ganglion, as in the first mentioned. From this junction arise

[1] In *Ommatostrephes pteropus* and *Illex coindeti*, examined for comparison with *Spirula*, are found, at the surface of the pedo-brachial connective, ten nervous bundles coming from the pedal centres properly so-called, and going each to be joined to one of the brachial nerves (Fig. M). There is then no need of histological researches (like those of Owsjannikow and Kowalevski, Ueber das central nervensystem und das Gehörorgan der Cephalopoden, *Mem. Acad. d. Sci. St Pétersbourg*, sér. 7, t. xi., 1867 ; and of Jatta, La innervazione delle braccia dei Cefalopodi, *Boll. Soc. Natur. Napoli*, anno 3, 1889) to show that the pedal ganglion (or of the funnel) contributes to innervate the arms. A similar disposition has already been observed in other Œgopsids by Hancock (On the nervous system of Ommastrephes todarus, *Ann. Mag. Nat. Hist.*, ser. 2, vol. x., 1852, p. 2), Pfeffer (Todarodes sagittatus [Lamk.] Stp., *Vidensk. Meddel. naturh. Foren.*, 1890, p. 238), and Appellöf (Teuthologische Beitrage, ii., *Bergens Museums Aarsberetning*, 1890, p. 8).

[2] In the paper : Pelseneer, Sur la valeur morphologique des bras et la composition du système nerveux central des Cephalopodes (*Arch. de Biol.*, t. viii., 1888), the ganglionic swellings from which arise the pallial nerves have been interpreted as anterior visceral (p. 752), and the value of pleural centres was refused to them (p. 749). A re-examination has made evident that all the visceral ganglionic elements form a single median mass and that the pleural centres are indeed those from which arise the pallial nerves.

posteriorly, thin threads proceeding towards the heart and the kidneys, and transversely to the right and left a branchial nerve which penetrates into the branchial axis, without swelling, at its base, into an "olivary" ganglion.[1]

As to the pallial nerves, they proceed from lateral portions (pleural ganglia) of the posterior infra-œsophageal mass; they are exceedingly strong (Pl. V. *pl.n.*; Fig. N, x), directed towards the dorsal side, traversing the wall of the "mesosoma" and arriving at the mantle, at the very point where the latter is joined to this mesosoma; at this point they form, as in all the Dibranchiates, "stellate" pallial ganglia, without being bifurcated before entering into these.[2]

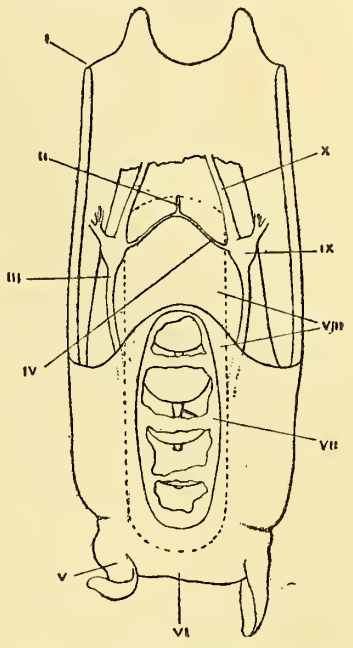


Fig. N.—*Spirula reticulata*, dorsal view, the anterior part of the mantle removed on this side (the internal part of the shell shown by a broken line); × 4. i, mantle edge; ii, median nerve; iii, nerve of the fin; iv, commissure of the stellate ganglia; v, fin; vi, terminal disk; vii, dorsal external part of the shell; viii, internal part of the shell; ix, stellate ganglion; x, pallial nerve.

The two stellate ganglia are united by a curved commissure (with anterior concavity), very thin (Fig. N, iv), but appearing stronger because it is joined to a venous trunk, which the nervous cord accompanies through all its course, passing to the surface of the mesosoma covering the anterior extremity of the shell; from the middle of the curve there arise a vein and a nerve directed forwards (Fig. N, ii), which, passing over the dorsal margin of the shell opening, become recurrent and run along, following the median line, the part of the mantle contained in the last chamber of the shell, the venous trunk emptying itself into the vena cava (see Circulatory System).

This commissure, with its median nerve, ought to be considered as formed by the two original pallial nerves of Cephalopods fused together, and the larger pallial nerves situated beyond the stellate ganglia (innervating especially the fins; Fig. N, iii) are adventitious formations necessitated by the great development of the margins of the

[1] Homologue of the osphradial ganglion of other Molluscs, but not functionally equivalent; in various Cephalopods this "olivary" or branchial ganglion is rather superficial (example, *Eledone*), but it does not send nervous fibres to the subjacent epithelium, and this does not contain any special sensorial cells. The fact that the osphradium has not yet taken its rise in Cephalopods is explained by the presence of the olfactory rhinophoric fossa at the entrance of the pallial cavity on the side where respiratory water enters, which renders a second olfactory organ (osphradium properly so-called) useless. The interbranchial papilla of *Nautilus*, identified by Lankester and Bourne (*Quart. Journ. Micr. Sci.*, vol. xxiii. p. 343, 1883), with the osphradium of Molluscs, is not itself a sensorial organ, and does not contain any ganglion homologue of the osphradial centre. But it appears to constitute simply a protective apparatus of a sensorial region, situated on the portion of the internal face of the mantle immediately anterior to the papilla, which is inclined above it; in this region a branch of the branchial nerve is divided into very numerous twigs, which send a great many bundles to the epithelium.

[2] As well as in "Loligopsis" (*Leachia*), according to Grant (On the structure and characters of Loligopsis, *Trans. Zool. Soc. London*, vol. i., 1833).

mantle which have overrun the shell. This union of the two primitive pallial nerves explains the origin of the "commissure" of the stellate ganglia, so well developed in all the Œgopsids,[1] already reduced in *Loligo*,[2] and still more so in the adult *Sepiola* (better marked in the embryos[3]), and finally disappearing in the Sepiidæ and Octopods; by the disappearance of the pallial siphon and the primitive mantle, the median nerve has been lost, the "commissure" not being then any longer carried forward by this nerve has not preserved its curvature, has become more posterior, and has passed into the mantle where it joins the two ganglia in a straight line.[4]

Behind the stellate ganglia, the pallial nerves, preserving sensibly their diameter (Pl. V. figs. 1, 2, 6, *f.n*; Fig. N, iii), are directed posteriorly in running along the wall of the shell-sac, but, immediately on leaving the ganglia, they give rise to a thinner latero-ventral trunk (Pl. V. fig. 6), innervating the mantle, and to another much larger one, which arrives at the fins, where it expands by dividing to an extraordinary extent, without, however, presenting ganglionic swellings (Pl. V. fig. 6).

Stomato-Gastric System.—In the Challenger specimen (the only one examined which was provided with a head), the "inferior buccal" ganglia, or stomato-gastric ganglia, have not been seen; they were apparently situated under the superficial muscular layer of the buccal bulb (as they are in some degree in certain Ommatostrephidæ). There can be no doubt of their existence; two parallel stomato-gastric nerves run along the ventral face of the œsophagus and end in the large gastric ganglion (Pl. VI. figs. 2, 3, *gl.*).

Sense Organs.—The olfactory pits, the otocysts, and the eyes are well developed.

A. The *olfactory pit* is situated quite at the back of the ocular prominence, at the junction of the lateral and ventral faces of the head (Pl. I. fig. 6, *ol.*; Pl. II. fig. 1, *ol.*). It is limited by a slightly elevated margin in the interior of which the bottom projects in the form of a papilla, the whole having thus the aspect of a "circumvallate papilla" of the tongue of mammals (Pl. VI. fig. 11).[5]

B. The *otocyst* is situated between the wings of the "cranial" cartilage and the

[1] For example, in *Ommatostrephes* (Hancock, *op. cit.*).

[2] Von Jhering, Vergleichende Anatomie des Nervensystemes und Phylogenie der Mollusken, p. 257, 1877.

[3] Joubin, Recherches sur la coloration du tégument chez les Céphalopodes (*Arch. de Zool. Expér.*, sér. 2, t. x. p. 306, 1894).

[4] The pallial nerves may then be joined to one another on the dorsal side of the digestive tube, as they are likewise in the Lamellibranchs, behind and at the back of the rectum; this enables us to understand the supra-rectal commissure of the Amphineura (*Chiton*, &c.), in the identification of which were found certain difficulties (see especially Lang, Lehrbuch der Vergleichenden Anatomie, p. 711, 1892; Bouvier and Fischer, Recherches et considérations sur l'Asymétrie des Mollusques univalves [*Journ. de Conchyl.*, t. xxxii. pp. 200, 201, 1892]; Grobben, Zur Kenntniss der Morphologie, der Verwandtschaftsverhältnisse und des Systems der Mollusken [*Sitzungsber. Akad. Wiss. Wien*, Math. Naturw. Cl., Bd. ciii. p. 85, 1894]). It is only a junction like that of the pallial nerves and in no way homologous to the visceral commissure; the Amphineura thus re-enter into the common plan of organisation of the Molluscs.

[5] The central prominence is probably the point of departure of the rhinophore in form of papilla of certain Œgopsids (*Chiroteuthis*, *Doratopsis*).

median and posterior infra-œsophageal ganglia (Pl. III. *Au.*; Pl. V. fig. 3, *Au.*). It is filled with a clear liquid and contains a great otolithic mass; the walls are of very great delicacy.

C. The *eye* is joined to the interior of the ocular chamber, in the first place by the sclerotic ligament (Pl. VI. fig. 13, *sc.lig.*), and in the second place by the fibres of the optic nerve traversing the perineural cartilage which bounds the posterior and superior sides of the orbit.

The great ocular sphere is thus completely separated from the ocular chamber in which it is enclosed, and which opens externally by the palpebral or "corneal" orifice (Pl. VI. fig. 13, *ap.*). It is really a pedunculated eye, enclosed in the sides of the head, as is the case in all the Dibranchiates. *Spirula* is therefore with regard to the eye a typical Œgopsid, contrary to the assertions of Gray[1] and Steenstrup.[2]

The palpebral opening is irregularly oval, angular inferiorly and in front; it measures one-tenth of an inch at its long diameter. The iris[3] has two concentric layers of deep brown pigment; the "pupilary" opening is relatively very small, and the centre of the great crystalline lens (rendered opaque by the action of the alcohol) entirely fills it.

III. Digestive System.

The mouth, situated in the middle of the oral disk, is surrounded by two lips, of which the exterior is the thickest (Pl. III., *l.e.*). The internal surface of the two lips is provided with compact longitudinal folds.

The *mandibles* have a horny aspect, a sharply-cutting margin, and a dark brown-black colour, as in the other Dibranchiates. From the middle of the floor of the buccal cavity, enclosed by the mandibles, arises a prominence almost entirely filling this cavity. A transverse dorsal depression divides this prominence into two masses, one anterior and the other posterior; the anterior one is soft and papillary, representing the tongue or so-called gustatory organ,[4] and the posterior one is the radula or odontophore. This last is divided by a rather deep longitudinal furrow into two lobes, the crests of which carry the lateral pointed and recurved teeth.[5]

The *salivary glands* consist of two pairs, as in the Œgopsids (for example, *Ommatostrephes*, Fig. L). The anterior glands are two little elongated glandular bodies, situated between the buccal mass and that part of the œsophagus which is found in front

[1] Gray, Catalogue of the Mollusca, p. 114.

[2] Steenstrup, *op. cit.*, p. 237.

[3] It is the fold formed before the true cornea, under the false external cornea.

[4] This "tongue" cannot be a sensorial organ, being in all the Cephalopods covered by a thick uninterrupted cuticle.

[5] Unfortunately, a satisfactory view of the radula cannot be given, the preparation having been spoiled in attempting to take out the lingual teeth; what was seen of it is represented, much magnified, in Pl. VI. fig. 7.

of the perineural cartilage. They are immediately applied against the buccal bulb[1] and ramify at the back of the brachial ganglia (Pl. V. fig. 3, *a*).

The posterior glands in *Spirula peronii* are placed dorsally, immediately behind the cartilaginous capsule, and in front of the liver, extending on each side of the œsophagus (Pl. III. *p.sl.*).[2] They are almost the same length as the auditory capsules, at the dorsal face of which they are found (in Pl. V. fig. 1, these glands are for the greater part hidden by the liver, and the small portion visible is not lettered).

An unpaired median salivary duct opens in front of the "tongue," upon the floor of the buccal cavity (Pl. VI. fig. 6, *sd.*); it could not be followed as far as its posterior extremity, but, by analogy with other Dibranchiates, it may be affirmed that it is the unique duct of the posterior salivary glands.[3]

The *œsophagus*, commencing at the posterior extremity of the great buccal mass, is directed backwards and traverses the central nervous system with its cartilaginous capsules (Pl. III. *oe.*). As far as the nervous system it forms a concave curve backwards (ventrally), then it recurves in the inverse sense, and after having traversed the nervous œsophageal collar, it passes ventrally backwards, between the posterior salivary glands and the lobes of the liver, then between the great lateral muscles it follows the median line near the ventral face; afterwards, having attained the level of the first whorl of the shell, it turns abruptly, almost at right angles, and, dilating a little, terminates in the right or cardiac half of the stomach, by a narrow opening (Pl. VI. fig. 3, *ca.*). This last is bounded on the left side by a slightly elevated ridge, the continuation of which borders a shallow groove in the wall of the cardiac extremity of the stomach. This terminal dilated portion of the œsophagus has thick and glandular walls, so that it forms a sort of rudimentary "proventriculus."

The *stomach* is divided into two chambers: right or cardiac (stomach properly so-called) and left or pyloric; these two divisions are separated by a constriction in the anterior wall. The cardiac chamber (Pl. VI. figs. 1–3, *cr.*) projects into the portion of the viscero-pericardial cavity which is situated to the right of the septum formed by the whorls of the shell; the pyloric chamber or appendage (Pl. VI. figs. 1–3, *ps.*) sinks into the opposite half of this latter cavity, the middle portion reposing on the walls of the body which covers the shell. When the stomach is open, it is seen that each of its divisions forms a sort of great compartment; that on the right side is subcylindrical, and

[1] As in the Œgopsids (example, Fig. L, x), where they are partly hid under the superficial musculature of the bulb. We know that in the Myopsids this anterior pair is very greatly reduced and intrabulbular.

[2] In *Spirula australis* they are, according to Owen, fusiform upon almost all their length (*Ann. Mag. Nat. Hist.*, ser. 5, vol. iii. pl. ii. fig. 10).

[3] The glands called posterior are then the anterior, from the morphological point of view, since their tube opens more in front than those of the glands called "anterior." The two pairs of salivary glands of Cephalopods correspond exactly to the two pairs existing in the Amphineura, where one of the two also opens before the radula (subradular glands of *Chiton*) by a single duct (Neomeniidæ).

has thick and muscular walls, whilst that on the left is separated from the rest of the organ by a distinct constriction, and its walls, like those of the median portion of the stomach, are thin and semitransparent. In front of this constriction its surface appears marked by numerous transverse striæ.

The thickening of the walls of the cardiac division is almost limited to its left (external) side, and arises specially from the strengthening of the muscular envelope of this region. The mucous layer of this cardiac sac is thick and spongy throughout. The muscular covering of the right (axial) side is not much stronger than that of the rest of the stomach.

The pyloric division has the form of an ovoid spiral sac (Pl. VI. fig. 2) united to the stomachal cavity by a broad neck. Its internal face is marked by a deep corrugation or depression (Pl. VI. fig. 3, *a*), which corresponds to a falciform prominence in the interior of the sac. The interior of the neck is smooth, but just where it passes into the pyloric cæcum immense folds of the mucous membrane commence, and become more and more strong and permanent, spreading in a slightly curved spiral over the surface of the internal sac (Pl. VI. fig. 4) and converging on its opposite face. The surface of the folds is itself marked by close-set oblique furrows. The junction between the pyloric division of the stomach and the intestine is marked by only a slight fold representing a pyloric valve.

To the right side of the cardiac sac in *Spirula peronii* is attached an elongated, recurved and whitish-looking, body (Pl. VI. fig. 3, *z*), with a glandular appearance, lying in the fold of the "peritoneum," from which arises the peduncle of the ovary; in *Spirula reticulata* this body was not seen.

The *liver* consists of two compact equal masses, a right and a left, which occupy the whole space left free by the otocysts, the salivary glands, and œsophagus, in the anterior half of the cavity of the body (Pl. III., *hp.*). Each of them is produced into a posterior lobe (Pl. VI. fig. 1), which with its corresponding lobe fills the pallial sac occupying the last chamber of the shell (Pl. V. fig. 1, *hp'.*).

The two hepatic ducts run from the anterior to the posterior region of the body with the œsophagus (Pl. III., *hpd.*), the one passing behind, the other in front of, the left division of the stomach (Pl. VI. fig. 1); they unite and open into the pyloric appendage. After having reached the stomach each tube is furnished with a great number of villous "pancreatic" cæca (Pl. VI. figs. 1, 2). The pyloric sac of the stomach and the pancreatic appendages of the hepatic tubes are freely surrounded by a thin transparent membrane (Pl. III. *ptn.*), an invagination of the "peritoneum" or walls of the viscero-pericardial cavity into which they thus project.

The *intestine* is very short and relatively wide; it arises from the left half of the stomachal pouch. It passes downwards and forwards, on the left side of the spire of the shell, and gradually narrows; it terminates at the anus, which is placed at

the extremity of a slight conical papilla in *Spirula peronii* (Pl. III. *an.*), whilst it is completely sessile in *Spirula reticulata* (Fig. R, viii). This anal opening has no filiform appendages, such as are found in other Dibranchiate Cephalopods. The intestine presents internally a longitudinal furrow bounded by two very distinct folds, as in all Cephalopods examined in this respect (Fig. O, i).[1]

The little *ink bag* is situated ventrally (Pl. III., *ik.*) in the bend formed by the intestine (Fig. R, iii); it opens into the intestine quite close to the anus.

IV. Circulatory System.

The heart is situated in the viscero-pericardial cavity towards the ventral aspect, in front of the spire of the shell and under the intestine and the kidneys (Pl. VI. fig. 8).

Fig. O.—Transverse section of the intestine of *Sepia*; × 18. i, longitudinal furrow; ii, intestinal epithelium.

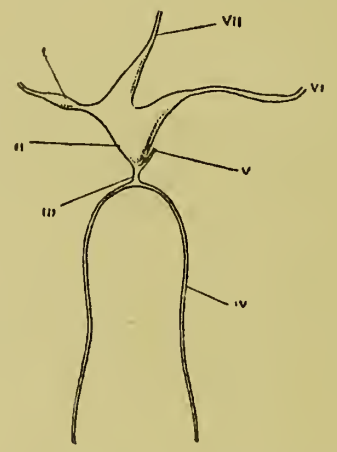


Fig. P.—Heart of *Spirula reticulata*, ventral view; × 4. i, right auricle; ii, ventriele; iii, posterior aorta; iv, posterior pallial artery; v, recurrent (genital) artery; vi, left branchio-cardiac vessel (auricle); vii, anterior aorta.

It is (especially in the individual of *Spirula reticulata* examined) very flat dorso-ventrally and asymmetric (Fig. P); the ventricle is almost entirely placed at the right of the median line, while at the left is found only one prominence towards the branchio-cardiac vessel or auricle.

[1] *Ommatostrephes*, *Sepiola*, *Sepia*, *Octopus*, *Nautilus*. A similar furrow has been met with in other Mollusca, as in certain Rhipidoglossids (example, *Trochus*). But in the initial portions of the intestine of Mollusca there is a corresponding longitudinal cushion (typhlosolis): *e.g.*, in all the Lamellibranchs examined from this point of view (*Anodonta*, *Anomia*, *Donax*, *Ostrea*), and the Gastropods, including the Pteropods (*Paludina*, *Helix*, *Auricula*, *Tritonia*, *Æolis*, *Actæon*, *Limacina*, *Clio*), and *Chiton* among the Amphineura. In all these animals, the intestine being much rolled up, it is difficult to determine the morphological position of this typhlosolis, but in the Cephalopods, where the intestine is only turned back and not twisted, we can see that the furrowed typhlosolis occupies the dorsal side, as is the case also for the organ of the same name known in the Oligochæta. It is then probable that the dorsal ciliated furrow of the intestine of Neomeniidæ also corresponds to it.

The ventricle is pointed behind and in front, each point being the origin of an aorta, but the two aortæ are not in the same line, the anterior being oblique from the outside towards the axis (Fig. P, vii).

The cephalic or anterior aorta, properly so-called, is directed towards the head; its distribution has not been followed in the incomplete specimen of *Spirula reticulata* examined, but in *Spirula peronii* a principal branch passes (as in other Cephalopods) between the pedal and visceral centres (Pl. V. fig. 4, *ar.*). The short posterior aorta (Fig. P) gives off immediately to the left a recurrent branch ("anterior" aorta), which supplies the rectum, and at least in part the genital organs (this is a character of the Œgopsids, this vessel arising anteriorly and directly from the ventricle in the Myopsids; the disposition observed in *Spirula* and the Œgopsids is evidently primitive, the parts supplied by this artery being morphologically posterior). It then immediately arrives at the shell and bifurcates, giving, on each side of the shell, a pallial branch (Fig. P, iv), which continues as far as the terminal disk and fins.

The vena cava is situated quite ventrally, its terminal portion (posterior) being alone visible in the incomplete specimen of *Spirula reticulata* examined. It receives a trunk from the back, which traverses the bottom of the little visceral sac of the last chamber; this trunk comes from the reunion of the two veins arising from the sinuses surrounding the stellate ganglia, veins accompanying the commissure of this last, and its median nerve (Fig. N, iv and ii). At the back of the anus, under the junction of the visceral nerves, the vena cava divides into two branches directed backwards and towards the sides (Fig. S); each of them passes into a renal sac (see further on), these uniting to the corresponding abdominal vein (Fig. S, vi), which presents the enlargement characteristic of Decapods (Pl. VI. fig. 8, *v.v.*), then uniting further to the pallial vein (Fig. S, viii) in forming the branchial heart (Fig. S, vii). This last (Pl. VI. *br.h.*; Pl. IV. figs. 2 and 4, *br.h.*), flattened dorso-ventrally, carries a little ventral appendage directed towards the median line (Pl. VI. fig. 8, *br.app.*; Fig. S, iii), which in *Spirula peronii* appears villous (Pl. IV. fig. 4, *a*) like the pericardial gland of *Nautilus*, to which it morphologically corresponds. From the branchial heart arises the afferent branchial vessel, shorter on the right than on the left (Fig. S, ix) and passing to the surface of the visceral sac on the ventral side of the oviduct (Pl. IV. fig. 5, *br.a.*). This afferent branchial vessel passes to the dorsal side of the branchial axis. The branchials, situated quite laterally almost near the dorsal surface, have already been described (see pallial cavity). The efferent branchial vessels occupy the ventral side of the branchial axis; on leaving the branchia, they pass before the afferent vessels which are parallel to them, then at the back of these last and the kidneys. That on the right side is much shorter than that on the left (as in *Ommatostrephes*, *Loligo*, &c., see Fig. P, i, and Pl. VI. fig. 8, *aur. aur'.*); it is also more swollen, constituting an apparent auricle, whilst to the left the branchio-cardiac vessel is long with a tolerably constant diameter. The two trunks, contractile in

all the Cephalopods, also merit the name of auricles; they empty on each side into the ventricle (Fig. P; Pl. VI. fig. 8).

Between the portion of the mantle enclosed in the last chamber of the shell and the part of the visceral sac contained therein, there is, in *Spirula reticulata*, a sharply limited sinus (Fig. Q, iv) with rather thick walls, communicating with the cavity of the membranous siphuncle; no other communication has been *seen* with this sinus, but it is certainly to be presumed that it presents in some place a contractile orifice analogous to "Keber's valvule" in the Lamellibranchs.

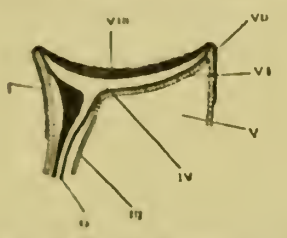


Fig. Q.—Median sagittal section of the terminal part of the siphuncle, left view; magnified. i, reflected mantle on the shell (ventral side) = P^8, Pl. III.; ii, membranous siphuncle; iii, shell siphuncle; iv, pallio-siphonal sinus; v, penultimate chamber of the shell; vi, last septum; vii, mantle reflected on the shell (dorsal side) = P^9, Pl. III.; viii, part of the visceral mass (liver) included in the last chamber.

The physiological action of this sinus appears very important and apparently regulates the hydrostatic conditions of *Spirula*, and consequently the production of new chambers of the shell. In fact the cavity of the membranous siphuncle is a blood sinus continuous with the preceding (in the terminal enlargement of the siphuncle this cavity occupies the dorsal side, see Fig. Q). This membranous siphuncle may then be distended by the blood coming from the pallial sinus, and the constriction of its proximal portion by the hermetic muff of the shell siphuncle (Fig. B, i) permits it by its enlargement to compress the gas contained in the shell siphuncle, without this gas being able to flow back into the last chamber under the mass of the liver. We thus explain how it can produce a change of equilibrium, in contracting or distending this gas, according as the *Spirula* wishes to descend or ascend, the pressure remaining always constant in the air chambers, quite separated from the siphuncle.

On the other hand, when by continued growth the weight of the animal threatens to become too great for the hydrostatic apparatus constituted by the air chambers of the shell, the distension of the pallio-siphonal sinus pushes forward insensibly the visceral mass resting upon the last septum, and thus permits the continuity of the secretion of the shell by the margins of the true mantle (Pl. III., margins of P^7); the last chamber is thus completely formed. Then the contraction of the sinus clearing this last, a new septum is secreted in turn by the whole surface of the true mantle (Pl. III., P^7) at the same time that a new segment of the shell siphuncle is produced by the membranous siphuncle.[1]

[1] It is evident that a mechanical interpretation of the means of progression in the shell, and the ascent and descent in the water, is alone admissible, and that no naturalist will accept that proposed by Barrande in 1877: "They must there and then have been inspired and imposed by the Creator at the moment when the Cephalopods had been introduced among the inhabitants of the Silurian Seas" (Barrande, Céphalopodes, Études générales, Prague, 1877, p. 210).

V. Excretory System.

The viscero-pericardial cavity occupies the posterior part of the body, on both sides of the central portion of the shell, which divides it almost completely into two halves, communicating with each other in front of the last whorl, this communication reaching a little backward in *Spirula peronii* between the penultimate and last whorl (Pl. III., *w''*, and Pl. IV. figs. 2, 4). This cavity encloses the heart and the ovary (the two specimens examined being females). The posterior portions of the stomach, although projecting into the viscero-pericardial cavity, are situated outside of the "peritoneal" membrane, which bounds it (Pl. IV. fig. 4, *ptn.*). This cavity does not possess openings which communicate directly with the outside, as is the case with the cavity (cœloma) of *Nautilus*. The orifices observed in the Challenger *Spirula* (Pl. IV. fig. 2, *ab*; fig. 4, *b*; fig. 5, *w'*) have been recognised as being produced artificially.

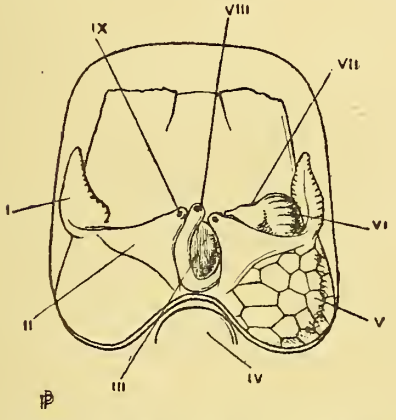


Fig. R.—Pallial cavity of *Spirula reticulata*, laid open, all the nidamental glands removed, ventral view; × 4. i, gill; ii, kidney; iii, ink bag; iv, shell; v, eggs in the oviduct; vi, oviducal gland; vii, aperture of the oviduct; viii, anus; ix, external renal orifice.

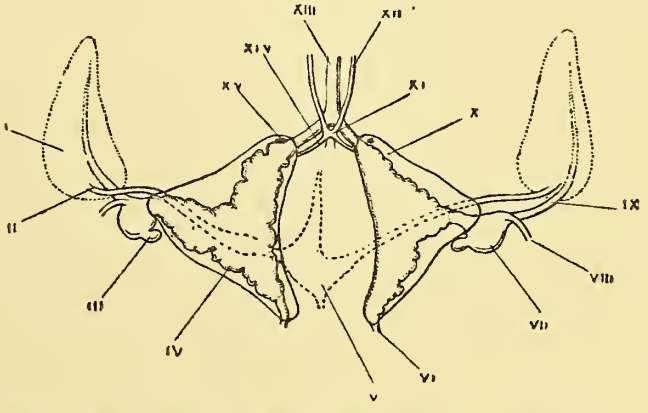


Fig. S.—Ventral view of the renal organs of *Spirula reticulata*; × 8. i, gill; ii, branchio-cardiac vessel; iii, appendage of the branchial heart; iv, spongy body of the kidney; v, ventricle; vi, abdominal vein; vii, branchial heart; viii, posterior pallial vein; ix, afferent branchial vessel; x, point where the reno-pericardial duct opens; xi, junction of the two visceral nerves; xii, visceral nerve; xiii, vena cava; xiv, branchial nerve; xv, external aperture of the kidney.

The kidneys are found behind the nidamental glands on each side of the rectum, at the ventral surface of the visceral sac (Fig. R, ii). They are almost triangular in form and have no communication with each other.[1]

The vena cava, as we have seen above, is divided at the back of the anus into two branches directed backwards; each one passes into a renal sac, and, joining the corresponding abdominal vein, form with it the afferent branchial vessel; the whole portion of

[1] Contrary to what Owen says, who speaks of a single renal sac (*Ann. Mag. Nat. Hist.*, ser. 5, vol. iii. p. 11).

these vessels contained in the renal cavity is covered by the spongy body (Fig. S, iv) which constitutes the excretory epithelium of the kidneys.

The two anterior renal orifices are situated on both sides of the anus (to the left between this last and the genital opening, Fig. R, ix); they are sessile, but surrounded by a prominent cushion.

The reno-pericardial orifice is near the external renal opening; it is found more laterally than the latter (Fig. S, x) upon the ventral face of the renal cavity leading into a reno-pericardial tube (Fig. T, ii), applied to this latter, obliquely transverse, and directed latero-posteriorly, at the same time enlarging. By analogy with what exists in the other Dibranchiates, we would suppose that this tube is continuous with the viscero-pericardial cavity, but in the *Spirula reticulata* examined that could not be actually demonstrated, the dissection having been already carried too far from other points of view.

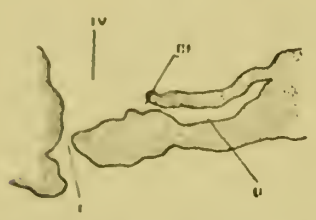


Fig. T.—Transverse section of the external renal aperture of *Spirula reticulata*; × 40. i, external renal aperture; ii, reno-pericardial duct; iii, aperture of the reno-pericardial duct; iv, renal cavity.

VI. Reproductive System.

1. *Sexes.*—The Challenger specimen, the "Blake" specimen and that from Professor Giard, were females, so that of the six individuals examined up to the present time from this point of view five were females (Blainville, Owen 1879, Challenger, "Blake," Giard) and only one male (Owen 1880). It is then very probable that in *Spirula* there is hyperpolygeny as in the other Cephalopods with non-autotomic hectocotyle.

2. *Ovary.*—The ovary occupies the greater part of the right half of the viscero-pericardial cavity (Pl. I. fig. 6; Pl. IV. fig. 1), and, in the *Spirula reticulata* examined, it even invades in part, in front of the shell and at the back of the heart, the left half of this cavity. It is attached at the postero-external (right) side of the stomach properly so-called or cardiac sac (Pl. VI. fig. 2), as in the Ommatostrephidæ for example.[1] It rises from the cœlomic wall (or "peritoneum") by a fold, which forms for it a peduncle and encloses the blood-vessels, upon which the ovary forms a sort of cluster (for the eggs, see further on: laying).

3. *Oviduct.*—The oviduct is situated to the left[2] and there occupies the greater part of the ventral region of the posterior half of the body in *Spirula peronii* (Pl. IV. fig. 3, *ov.*), as well as in *Spirula reticulata* (Fig. R, v). In the two specimens examined it was

[1] Contrary to what Owen says (*op. cit.*, p. 12), according to whom the ovary is to the left.

[2] And not at the right, as indicated in the Traité de Zoologie of Claus.

absolutely stuffed with eggs pressed one against the other. The oviduct passes under the branchio-cardiac vessel (Pl. IV. fig 4, *od.*), that is to say, on the dorsal side of this, as in the Œgopsids (*Ommatostrephes*, *Onychoteuthis*, *Enoploteuthis*, &c.). Near its extremity it is inflected towards the median line (Fig. R) and there presents a swollen oviducal gland, of an arched form (Pl. IV. fig. 5), with parallel striæ (Fig. R, vi). Finally, the oviduct opens immediately after, obliquely (its opening being anterior, whilst its extremity is directed transversely near the axis), on the left side of the renal orifice almost at the same level (Fig. R, vii).

4. *Nidamental Glands.*—Quite behind the pallial cavity, upon the ventral surface of the visceral mass, there is on each side of the ink gland (Pl. I. fig. 7) a swollen nidamental gland, of an irregular ovoid form, with the long axis oblique, with a radial appearance and leaved structure (Fig. C, iv ; Pl. I. fig. 6 ; Pl. II. fig. 1 ; and Pl. IV. fig. 1, *n.g.*), as in the majority of Decapods.

Before the nidamental glands, and partially under their anterior portion, there

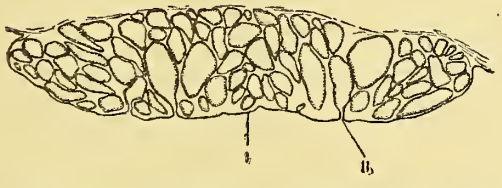


Fig. U.—Transverse section of an accessory nidamental gland of *Spirula reticulata* ; × 18. i, ventral side ; ii, glandular pore.

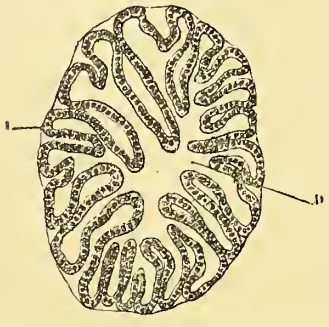


Fig. V.—Transverse section of an ovarian egg of *Spirula reticulata* ; × 100. i, vitelligenous follicle; ii, egg substance.

exist in the specimens procured by the Challenger (Pl. I. fig. 7, *x*), by the "Blake" (Pl. II. figs. 1, 2, *x*), and by Professor Giard (Fig. C, iii), prominences forming full compact organs almost in contact, the one with the other, on the median line. These prominences cover the kidneys, described above, but have not any relation with them ; they can be taken away without the renal cavities being opened, and therefore belong to the integuments.

Their structure (in the specimen, imperfectly prepared, which has been examined) reveals sufficiently the character and glandular function of these organs (Fig. U). They are formed of numerous cæca opening on the ventral surface by little pores. Besides their structure, their situation determines them to be accessory nidamental glands (compare specially a young *Sepia*[1]) ; the fact that these organs have not been noticed in the *Spirulæ* already described need not astonish us, and we may suppose that

[1] Brock, Ueber die Geschlechtsorgane der Cephalopoden (*Zeitsch. f. wiss. Zool.*, Bd. xxxii. pl. iii. fig. 28, 1879).

these specimens were not quite mature, the accessory nidamental glands being in fact little developed and scarcely visible in immature individuals.[1]

5. *Laying or deposition of the eggs.*—The manner in which the eggs are deposited is unknown. We know, however, that the eggs contained in the oviduct are rather large (Fig. R; Pl. IV. fig. 3, *ov.*) and with abundant vitellus, as the structure of the ovarian ovule shows, provided with a vitelligenous follicle with multiple folds in the interior of the eggs (Fig. V.). On the other hand, we may also infer that the eggs when once laid are enveloped in a rather thick coating, since *Spirula* is provided not only with an oviducal gland, but further with properly so-called accessory nidamental glands.

VII. Classification.

A dozen of different specific names have been applied to the shells of the genus *Spirula*. But even in the opinion of a conchologist[2]: "it is impossible to determine to which of the species (if they are distinct) the names *applied to the shells* belong."

On the other hand, the number of complete specimens of *Spirula*, which have been fully examined and described, is exceedingly limited (see Introduction). It results from this that there are no means of attaching a definite value to the names originally imposed or adopted, from the want of sufficiently distinctive characters.

In a provisional way I propose to consider the Challenger specimen as the type of the species *Spirula peronii*; the specimen described by Owen in 1879 as the type of the species *Spirula australis* (=*lævis*, Gray), to which the "Blake" specimen appears to be related; and lastly, Professor Giard's specimen as the type of the species *Spirula reticulata* (=*vulgaris*, Leach). So that we may establish provisionally the following table, which further knowledge and a comparison of future specimens may possibly modify:—

1. No distinct furrow separating the mantle from the disk. *Spirula peronii*, Lamarck (Pl. I. figs. 1–4).
2. Terminal disk separated from the mantle by a deep furrow.
   - A. Sub-epidermic reticulation not very distinct. *Spirula australis*, Lamarck (Pl. II. figs. 1–3).
   - B. Sub-epidermic reticulation very marked. *Spirula reticulata*, Owen (Figs. A, C, I, J, N).

[1] Brock, *op. cit.*, p. 72.

[2] Gray, Catalogue of the Mollusca, p. 115.

VIII. Ethology or Bionomics.

The conditions of existence of *Spirula* are almost entirely unknown. We know that the shells of this genus are thrown in very great numbers upon certain shores, and that, not being able to fall to the bottom on account of their lightness, they are often carried by currents to considerable distances. It is the same with the animal, when *dead;* it is carried to the surface by its shell playing the *role* of float (for example: Péron's specimen, those of the "Recherche" [Robert, 1856], and those of Professor Giard), or it may even be carried as far as some sea-shore (for example: Owen's specimen [1879] and that in the Sydney Museum). But never has a *Spirula* been collected alive, at the surface nor even near the surface.[1]

Only two individuals have been dredged: one in 360 fathoms by the Challenger and one in 950 fathoms by the "Blake," and these individuals were dead.

Spirula then is not a pelagic animal; it must be an inhabitant of rather deep water. In fact if we examine the various known localities where *Spirula* has been met with, and those where its shell is thrown up in great quantities, we find that they belong only to a few principal centres :—

1. Between Australia and New Zealand.[2]
2. Banda Sea.[3]
3. West Indies.[4]
4. N. W. of Africa.[5]

However, in each of these centres, or very near them, is found, to use the usual term in physical geography, a "deep" or oceanic surface of relatively small extent, with a very rapidly increasing depth up to 2500, and even 4000, fathoms.[6] It may therefore be predicted with sufficient certainty that, to find perfect specimens of *Spirula*, it is necessary to search in deep water in one or other of the deeps here indicated.

[1] Gray (On the animal of Spirula, *Ann. Mag. Nat. Hist.*, scr. 1, vol. xv. p. 259) says :—"I am informed by M. Clausen that he had several specimens of this animal alive, and kept them some time in a vessel filled with sea water, and that they had the power of ascending and descending at pleasure." But from such an indefinite indication we cannot have any certainty that it was indeed *Spirula*, no other mention having been made by M. Clausen of such an important fact.

[2] Specimens of Péron, of the Sydney Museum, and of Owen (1879).

[3] Fragments of Rumphius (Amboina), of Owen (Timor), and Challenger specimen.

[4] "Blake" specimen.

[5] Specimens of Cranch, of Robert, of Professor Giard, and another mutilated specimen which, Mr Craven, F.L.S., tells me, was taken between Madeira and the Canaries.

[6] See especially the large chart (planisphere) accompanying the Narrative of the Cruise of H.M.S. Challenger.

As to what is the mode of life of *Spirula*, Agassiz has supposed, from the disposition of the chromatophores, that the posterior part of the living individual remains plunged in the mud at the bottom. However, in the two specimens taken by the Challenger and the "Blake," it is noticed that it is precisely at the posterior part that the chromatophores are specially preserved (Pl. II. figs. 1, 2; Pl. VI. fig. 14). Further, the funnel of *Spirula* is as well developed as in the other Cephalopods. This animal is not then sedentary, but a good swimmer, which the existence of fins at the posterior part likewise confirms; these fins would evidently not be found there if the part were plunged in the mud.

If we now compare the following facts: on the one hand, that *Spirula* is a swimmer and that it keeps to the greater depths (since it never has been observed living at the surface or near it), and on the other hand that as soon as dead the animal is carried away by its shell towards the surface, we ought evidently to conclude that the living animal compresses a part of the gas contained in the "phragmocone," apparently the gas enclosed in the siphuncle, and this by the action of the pallio-siphonal sinus, as has been explained above (see Circulatory System).

The rarity of *Spirula* is thus explained by the abyssal nature of the animal. That the animal is extremely rare is proved by the fact that among the inhabitants of certain islands of the South Pacific—where the shells of *Spirula* are extremely abundant—the opinion prevails that the shell "has no animal."

The circumstance that the individuals found floating, or thrown up on shore, are generally incomplete and mutilated, might be explained by the interpretation of Robert, according to whom Siphonophores (*Physalia*) prey upon *Spirula;* he says[1] that one of the specimens captured by the "Recherche" "had been taken among the tentacles of a *Physalia*."

IX. Phylogeny.

The systematic position of *Spirula* among the Dibranchiate Cephalopods is in no way fixed. In 1879, Brock expressed the opinion that *Spirula* must be ranked among the Myopsid Decapods.[2] But in a later work[3] he retracted that view, declaring that *Spirula* had nothing to do with the Myopsids, that it is doubtful if it be an Œgopsid, and that it probably represents a special group. In 1881, Steenstrup maintained,

[1] *Comptes rendus*, t. ii., 1836, p. 363.

[2] Brock, Studien über die Verwandtschaftsverhältnisse der dibranchiaten Cephalopoden, Erlangen, 1879, p. 21.

[3] Brock, Versuch einer phylogenie der dibranchiaten Cephalopoden (*Morph. Jahrb.*, Bd. vi., 1880, p. 84).

however, the opinion that *Spirula* is a Myopsid,[1] and this view is generally adopted in the treatises on Conchology.

The facts presented above relative to the organisation of the genus show that it has nothing at all to do with the Myopsids, but that, according to the following characters, it is certainly an Œgopsid:—Eye with cornea (false cornea) widely open; central nervous system very elongated; short junction of the two visceral nerves to the back of the anus; "anterior" salivary glands well developed; liver not traversed by œsophagus, aorta, &c.; posterior aorta with recurrent branch (genital); renal orifices sessile; tentacular arms incompletely retractile. This conclusion that *Spirula* (whose archaic character is incontestable[2]) is an Œgopsid agrees with the fact that the Œgopsids are certainly the most archaic of the Dibranchiates.

If we wish now to seek for the origin of *Spirula* we must evidently acknowledge that it separated very early from the stock of the Œgopsids, before the acquisition of the rostrum characteristic of all the testaceous Dibranchiates, and before the phragmocone (corresponding to the shell of the Molluscs) had become internal and had been reduced (it is already more so in the Belemnites than in *Spirula*). This conclusion agrees with the fact that *Spirula*, in the direction it has followed, has undergone some specialisations, which are not observed in the generality of Œgopsids, for instance the loss of the right oviduct (of which there have not been found any distinct traces); and the acquisition of accessory nidamental glands.

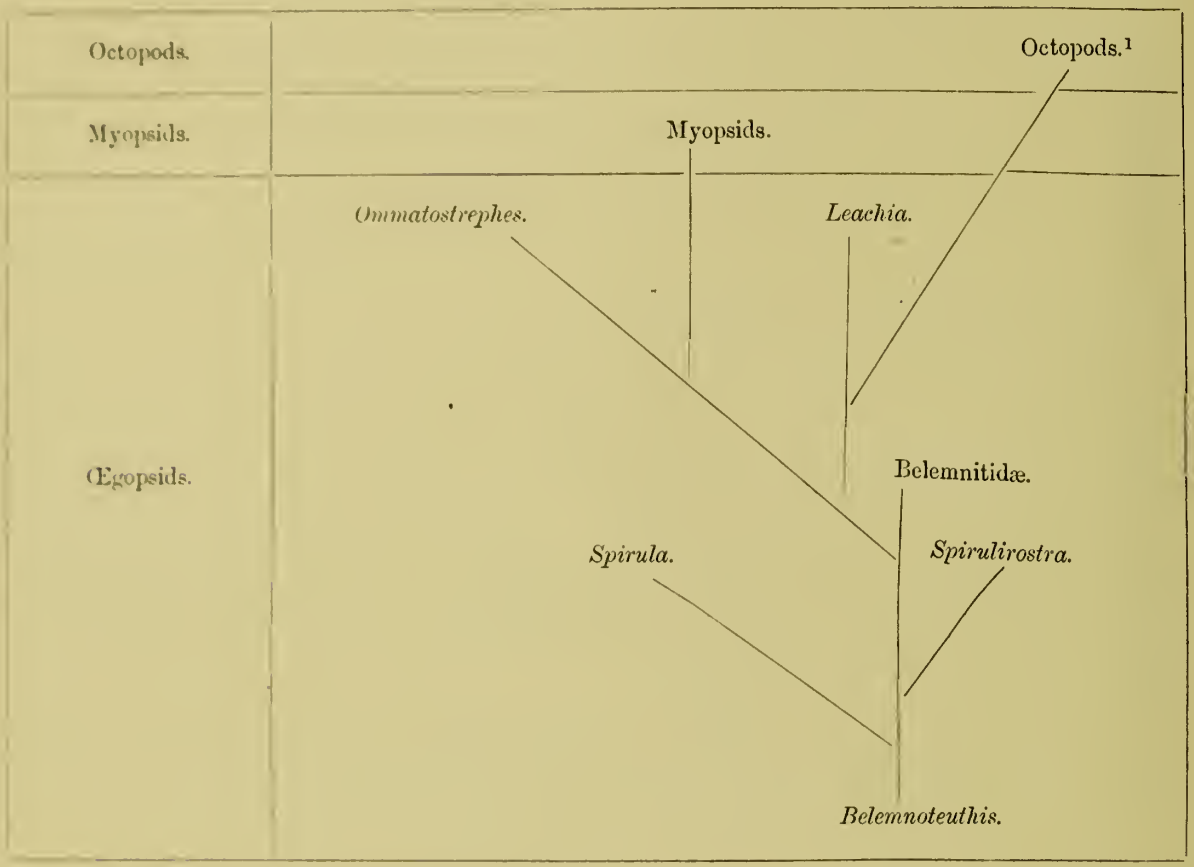
In short, we may say that *Spirula* must have come from a Belemnite-like form, still without rostrum (as *Belemnoteuthis*), the right phragmocone of which, still external (at least in part), is rolled up in an inverse sense to that of *Nautilus*.[3]

[1] Steenstrup, *op. cit.*, p. 237: "Non seulement parmi les Myopsides, mais aussi dans la division des Sépiens."

[2] Especially on account of the following characters: shell still partially external; anus without valvules, as in *Nautilus;* kidneys still without communication with each other.

[3] It appears most probable that *Spirula* comes from a straight ancestor and not from a rolled form in the inverse sense (as *Nautilus*), for there is nothing in its organisation which shows that it has been unrolled and then re-rolled in the inverse sense.

The phylogenetic relations of *Spirula* with other Dibranchiates may be represented by the following table:



[1] The relations of the Octopods with the Egopsids (more archaic), and especially the group *Leachia*, are demonstrated by the following facts:

1st. Certain of these last have not more than eight arms (*Leachia*, *Chaunoteuthis*, *Chiroteuthis lemplandi*, adult *Veranya*, the Cephalopod [embryo] of Grenacher).

2nd. *Cranchia* and *Leachia* among the Egopsids, and the generality of Octopods, are deprived of a well-developed "resistance" apparatus.

3rd. The Octopods, like the Egopsids, have still two pairs of well-developed salivary glands.

4th. *Leachia* and *Chiroteuthis lemplandi* have no longer an infundibular valvule like the Octopods.

5th. The kidneys of the Octopods and of the Egopsids stretch only to the ventral side of the visceral sac.

6th. The Octopods and the Egopsids have two oviducts.

7th. *Cranchia* and *Leachia* have no longer any nidamental glands, like the Octopods.

8th. In the Octopods, like the Egopsids, we find cases of hectocotylised arms on the right or on the left.

PLATE I.

PLATE I.

Spirula peronii, female (Challenger specimen).

Fig. 1.—Left side.

Fig. 2.—Ventral side.

Fig. 3.—Dorsal side.

Fig. 4.—Posterior or aboral end.

Fig. 5.—Dorsal side; the free mantle is cut along the median dorsal line and the halves divaricated.

Fig. 6.—Ventral side, the free mantle laid open in the median line and the lateral portion divaricated; moreover, the right wall of the "episoma" is removed so as to lay open the right half of the viscero-pericardial cavity.

In all the figures:

a, *b*. remains left by the colouring matter of the irides of the eyes on the inner surface of the mantle in consequence apparently of the strong contraction upon them.

an.	Anus.
br. br'.	Gills.
d.i.	Median dorsal infundibular apophyse (nuchal cartilage).
E. E'.	Eyes.
F. F'.	Fins.
fs.	Terminal fossa and papilla.
I.c.	Collar of the infundibulum.
ik.	Ink bag.
I.v.	Infundibular valve.
li. li'.	Right and left infundibular apophyses.
ng. ng'.	Nidamental glands.
ol. ol'.	Olfactory organs.
o.m.	Mass of the ovary.
o.d.	Oviduct.
pb. pb'.	Palliobranchial ligaments.
P. P'.	Mantle.
P.d. P.l. P.l'.	Dorsal and lateral lobes of the free edges of the mantle.
Sh.	Shell seen through the ventral and dorsal openings.
T. T'.	Tentacular arms.
x.	Accessory nidamental glands.

I, II, III, IV, I', II', III', IV', brachia.

Fig. 1
× 2

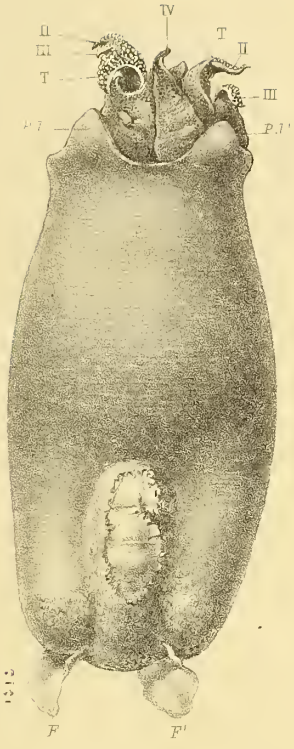


Fig. 2
× 2

Fig. 3
× 2

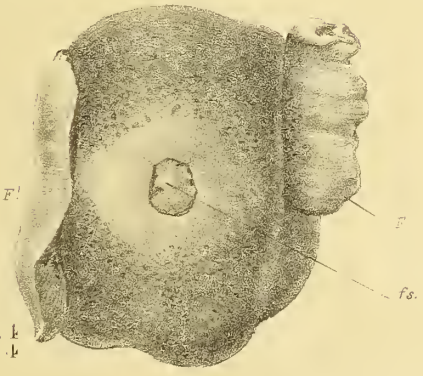


Fig. 4
× 4

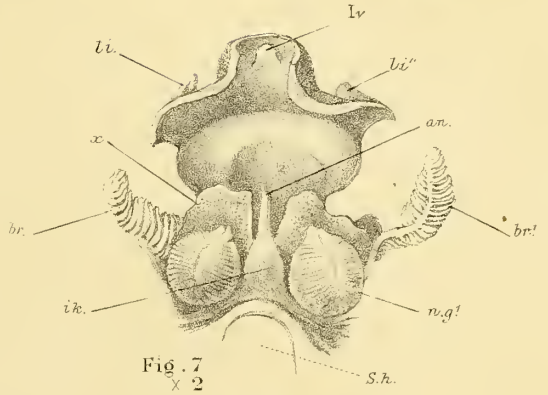


Fig. 7
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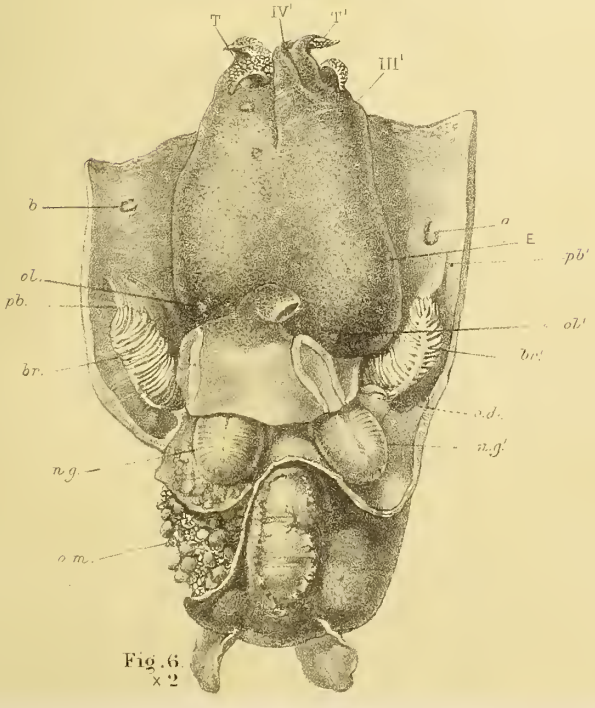

Fig. 6
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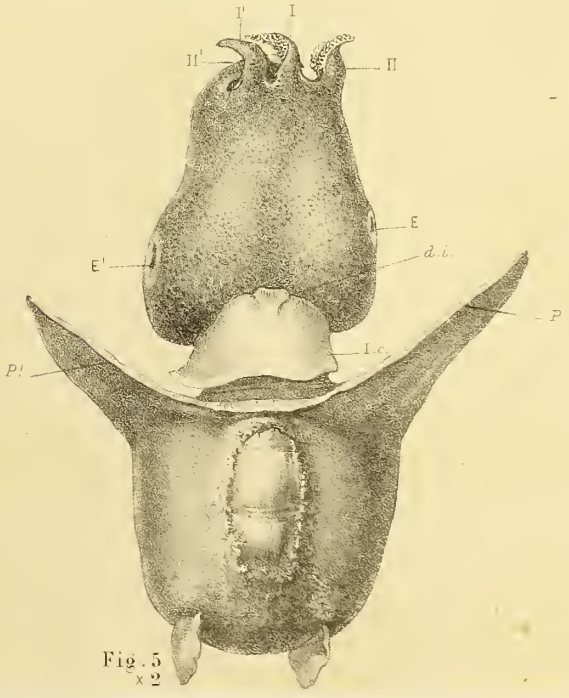

Fig. 5
× 2

BRITISH MUSEUM
NATURAL HISTORY

PLATE II.

PLATE II.

Figs. 1–3.—*Spirula* (*australis*?), female ("Blake" specimen).

Fig. 1.—Ventral view.
Fig. 2.—Lateral left view.
Fig. 3.—Terminal (aboral) view.

Letters as in Pl. I.:—*aq.*, the papillæ for the opening of the kidneys; *cr.*, inner band of chromatophores; I., infundibulum; *lpa.*, lateral pallial apophyses.

Figs. 4–7.—*Spirula peronii*, structure of the shell.

Fig. 4.—A septum, in face.
Fig. 5.—A longitudinal median section from near the anterior end.
Fig. 6.—A longitudinal section from near the apical end of the outermost whorl.
Fig. 7.—Apical chamber and posterior half whorl.

a. The cog-like processes of the apical end of the siphuncular tube in each chamber.
b. Inner or ventral thickening band.
c. Ligament-like body continued from the siphuncular cæcum to the wall of the initial chamber.
ch. Chamber; ch^1, first spherical chamber; ch^2, ch^3, ch^4, second, third, fourth chambers.
psph. Blind apical end of the shell siphuncle, or siphuncular cæcum.
sp. Septum.
sph. Prolongation of the septum into its siphuncular tube.

Fig. 1.
×2

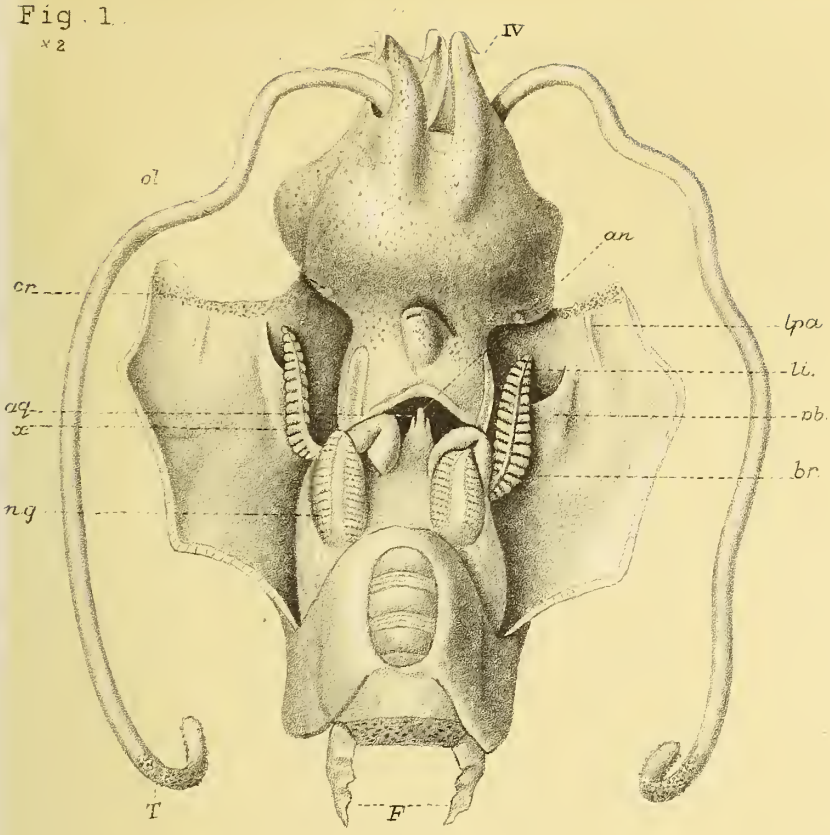

Fig. 2.
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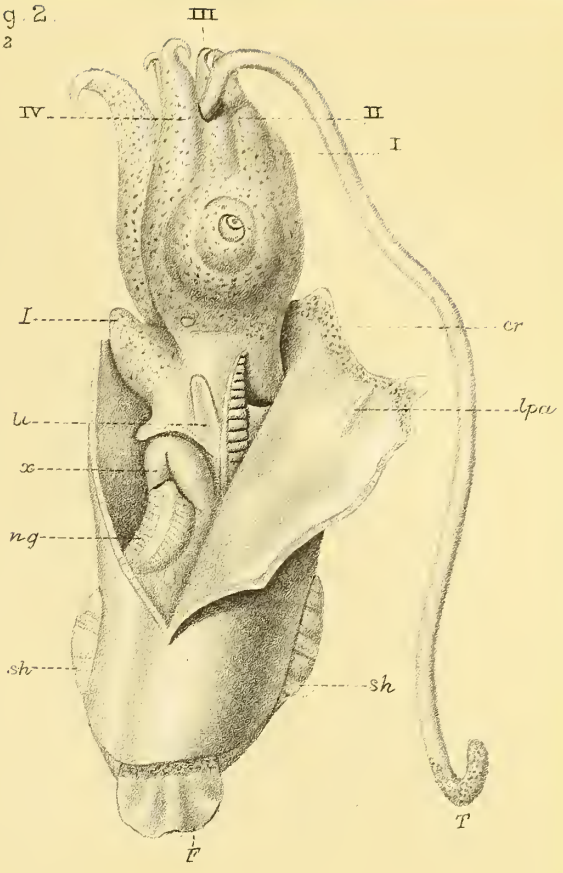

Fig. 4.
×8

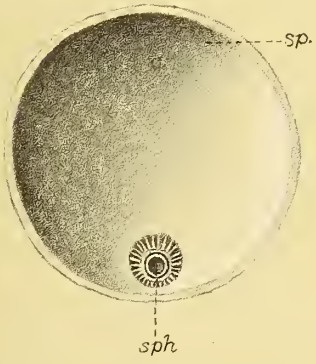

Fig. 5
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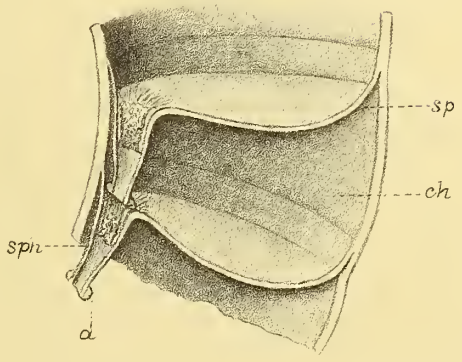

Fig. 3.
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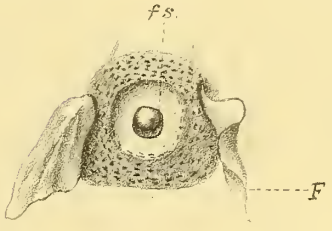

Fig. 7.
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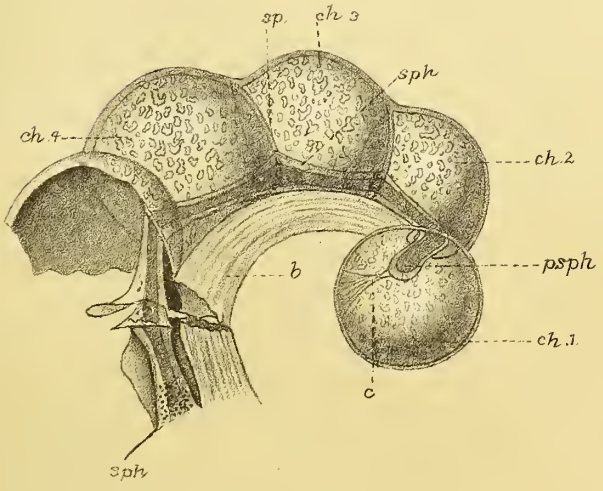

Fig. 6.
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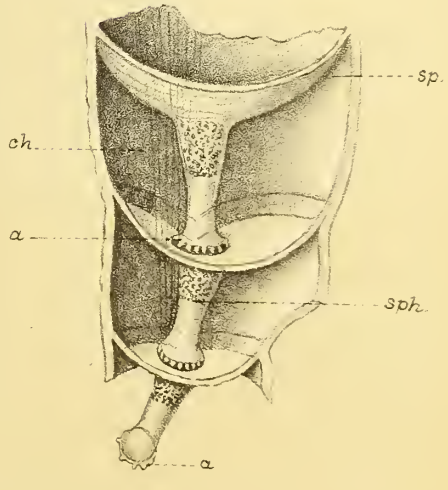


BRITISH MUSEUM
NATURAL HISTORY

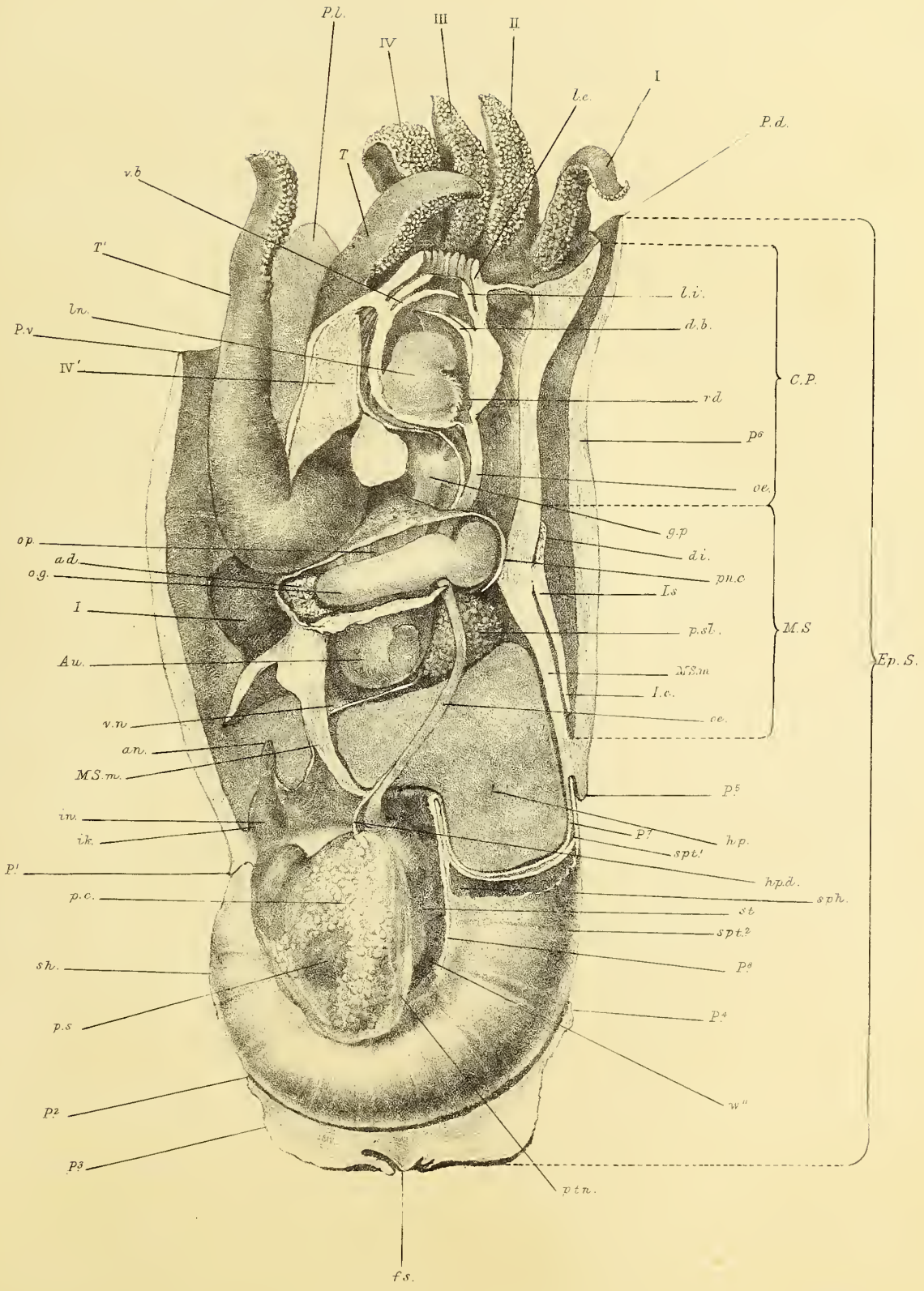
PLATE III.

PLATE III.

Spirula peronii.

A vertical longitudinal section, supposed to be taken somewhat to the left of the middle line. The left lobe of the liver, left posterior salivary gland, left branchia and half of the beaks and lips are removed; and the section passes through the centre of the terminal fossa. Drawn to scale of 4 diameters.

ad.	White (adenoid?) body.
an.	Anus.
Au.	Right auditory sac.
C.P.	"Cephalopodium" (= head + foot).
d.b.	Dorsal beak.
d.i.	Median dorsal infundibular apophyse (nuchal cartilage)
Ep.S.	"Episoma" (= visceral sac and mantle).
fs.	Terminal fossa.
g.p.	Brachial ganglion.
hp.	Right lobe of the liver.
hpd.	Duct of the right lobe of the liver.
I.	Infundibulum.
I.c.	Infundibular collar.
ik.	Ink bag.
in.	Intestine.
Is.	Infundibular attachment.
l.e	External lip.
l.i.	Internal lip.
ln.	Lingual portion of the odontophore.
M.S.	"Mesosoma" (connecting the Cephalopodium with the Episoma).
MS.m.	Mesosomatic muscular wall.
oe.	Œsophagus.
o.g.	Optic ganglion.
op.	Optic nerve.
P^1. P^2. P^4. P^5.	Edges of the mantle at the shell openings.
P^3.	Mantle aboral disk behind the shell, with the terminal fossa.
P^7.	Shell-secreting surface of the mantle.
P^6.	Part of the mantle reflected over the ventral wall of the anterior chamber of the shell, in the middle line.
p.c.	Pyloric cæca ("pancreatic follicles").
P.d. P.l.	Dorsal and lateral lobes of the free edges of the mantle.
pn.c.	Perineural cartilaginous capsule, cut away on the left side to show the left optic ganglion with the nerves proceeding from it.
p.s.	Spiral pyloric appendage or "pyloric sac."
p.sl.	Posterior salivary glands.
ptn.	"Peritoneum."
P.v.	Ventral edge of the mantle.
rd.	Radula.
sh.	Shell.
sph.	Siphuncle of the shell.
spt^1. *spt*^{2}.	Two last septa of the shell.
st.	Stomach (cardiac sac).
T. T'.	Tentacles (the left one is shown as it was folded in the retracted state, but the "elbow" is turned outwards and downwards).
v.b.	Ventral beak.
v.n.	Visceral nerve going to heart and branchiæ.
w''.	Passage connecting the right and left divisions of the viscero-pericardial cavity.
I, II, III, IV.	The inner face of the brachia of the right side.
IV'.	Base of corresponding left brachium.



× 4

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SPIRULA PERONII.

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NATURAL HISTORY
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PLATE IV.

PLATE IV.

Spirula peronii.

Fig. 1.—Right side; the walls of the mantle and of the episoma behind it are cut away.

a. Posterior limit of the pallial cavity.
g.s. Ganglion stellatum.
I.m.r. Retractor muscle of the infundibulum.—Other letters as in the foregoing plates.

Fig. 2.—Right side; dissection carried further.

a, b. Style introduced into an apparently natural aperture on the inner side of the stem of the right branchia.
br. Stump of the stem of the right branchia.
br.a. Afferent branchial vessel.
br.h. Branchial heart.
c.s. Cardiac sac of the stomach.
o.m. Root of the ovary.
w''. Passage connecting the right and left divisions of the viscero-pericardial cavity.—Other letters as before.

Fig. 3.—Left side; the wall of the episoma removed.

a. The visceral wall of the pallial cavity cut away.
b. Wide artificial opening.
ov. Ova.

Fig. 4.—Aspect of fig. 3, showing the contents of the viscero-pericardial cavity after the mass of the ova was removed.

a. Appendage of the left branchial heart.
b. Style introduced into an artificial opening of the viscero-pericardial cavity.
br.h'. Left branchial heart.
o.d. Oviduct.
p.c. Pancreatic cæca.
p.s. Pyloric spiral sac of the stomach.
p.t.n. "Peritoneal" sac.—Other letters as before.

Fig. 5.—Upper part of the same aspect as fig. 4, with the left branchia turned down.

a. Style.
br.a. Afferent branchial vessel.
M. Projection formed by the left accessory nidamental gland.
w'. Artificial aperture in the viscero-pericardial cavity.

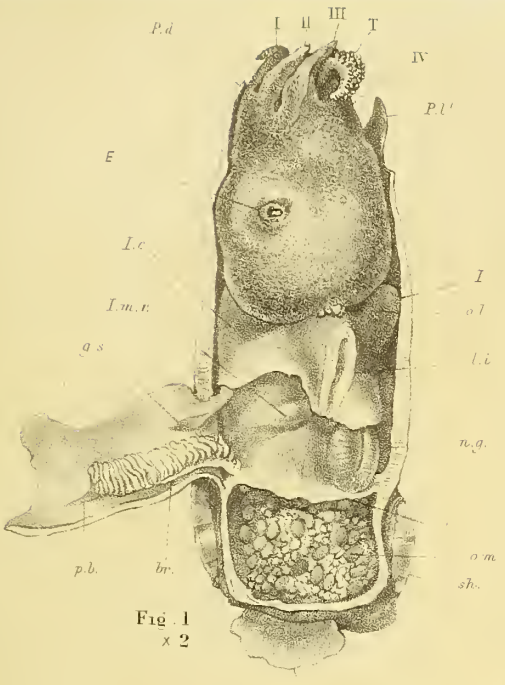

Fig. 1
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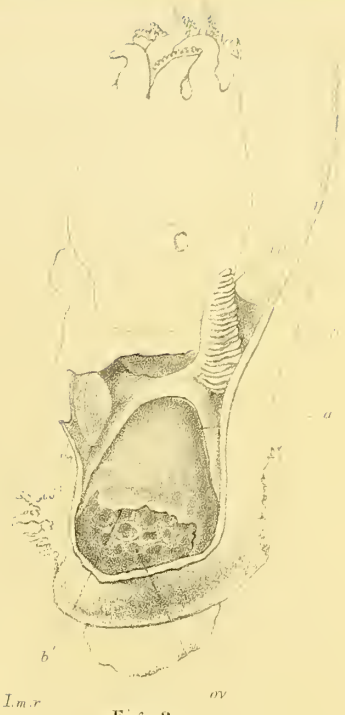

Fig. 3
x 2

Fig. 5
x 4

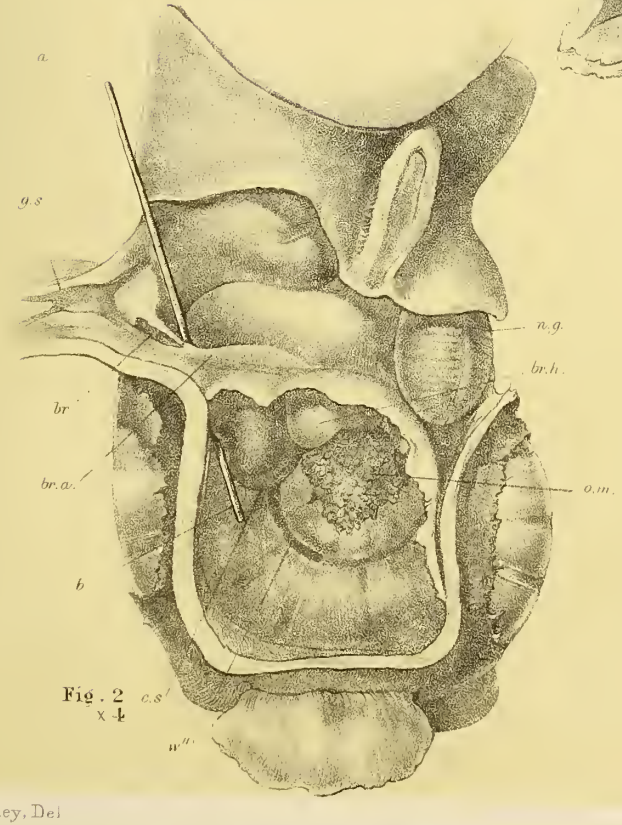

Fig. 2
x 4

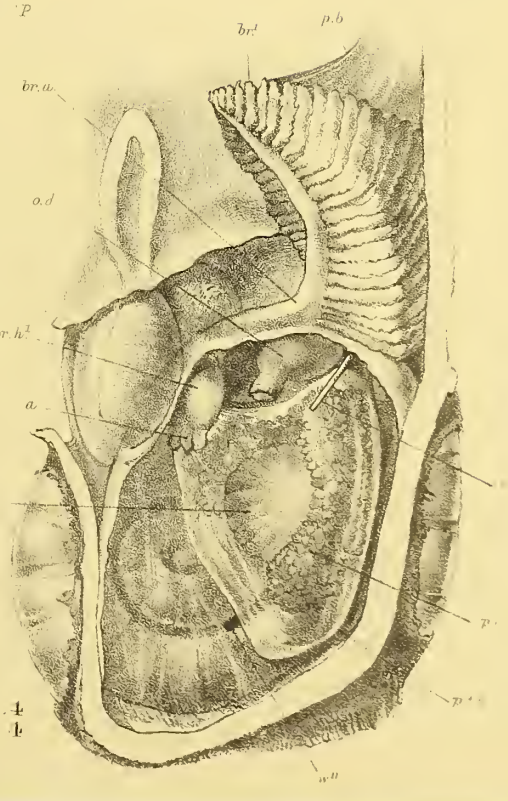

Fig. 4
x 4

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SPIRULA PERONII.

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PLATE V.

PLATE V.

Spirula peronii.

Nervous system ; all the figures are drawn to the scale of four times the natural size.

Fig. 1.—Dissection from the dorsal side.

a.d.	White body.
B.m.	Buccal mass.
bm.r.	Retractor muscles of *B.m.*
br.r.	Retractor muscles of arms.
E.	Orbit.
f.n.	Nerve to the fin.
g.c.	Cerebral ganglia.
g.s.	Ganglion stellatum.
h.p.	Anterior part of the liver.
h.p'.	Posterior moieties of the hepatic lobes.
I.	Infundibular collar.
Int.	Integument.
M.	Mouth.
M.S.m'.	Mesosomatic muscular substance.
œ.	Œsophagus.
o.g.	Optic ganglion.
P.	Wall of the "episoma."
pl.n.	Pallial nerve.
p.n.c.	Perineural cartilage.
s.b.g.	Superior buccal ganglion.
sh.s^1. *sh.s*^{2}.	Anterior and posterior parts of the shell sac.
sh.w.	Shell wall.
sph.	Siphuncular tubes of the shell.
sph.m.	Membranous siphuncle.
spt^1. *spt*^{2}.	The two last septa of the shell.
s.w.	Shell wall.

Fig. 2.—General view of the nervous system, from the dorsal side.

g.ch.s.	Chlamydo-splanchnic (pleuro-visceral) ganglia.
g.p.	Brachial ganglion.
v.n.	Visceral nerves.—Other letters as before.

Fig. 3.—Side (left) view of the central nervous system, with the perineural cartilage cut through.

a.	Anterior salivary gland.
A.u.	Otocyst.
g.p.	Pedal ganglia.
g.p'.	"Pes anserinus": brachial ganglia.
i.n.	Infundibular nerve.
o.g.	Right optic ganglion.
o.g.p.	Peduncle of left optic ganglion cut through.
pn.c^1. *pn.c*^{2}.	Perineural cartilage cut through, where it roofs respectively over the cerebral and chlamydo-splanchnic ganglia.
pn.c^4.	Lateral broad alæ of the perineural cartilage.
pn.c^5.	Median lower process of the perineural cartilage.—Other letters as before.

Fig. 4.—Side (left) view of the central nervous system, the left half of the perineural cartilage removed.

ar.	Passage for artery.
c.ch.c.	Cerebro-"chlamydo-splanchnic" connective.
cp.c.	Cerebro-pedal connective.
g.p.c.	Brachio-pedal connective.
p.ch.c.	Short pedo-chlamydo-splanchnic connective.
pn.c^3.	Perineural cartilage investing the pedal ganglia.
x.	Cerebro-brachial connective.

1, 2, 3, 4, 5, Brachial and tentacular nerves.—Other letters as before.

Fig. 5.—The "pes anserinus" and its connectives with the pedal ganglia, the right and left lobes separated and spread out.—Letters as before.

Fig. 6.—The right "stellate" ganglion and nerve to the fin.

ar.	Artery to the mantle.	*F.*	Fin.
β.	Inner wall of pallial cavity.	*v.n.s.*	Venous sinus.

Fig. 1.

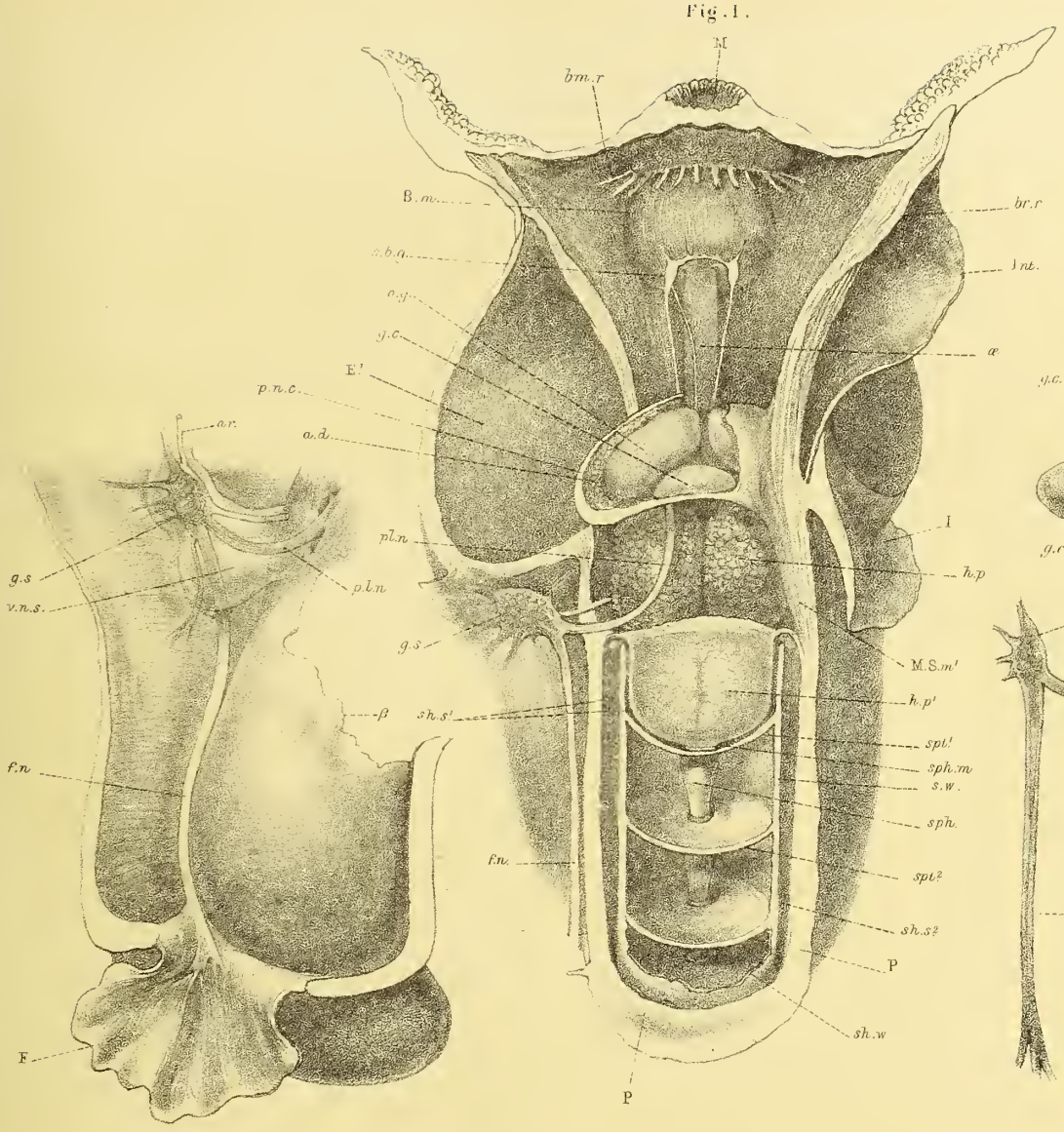


Fig. 2

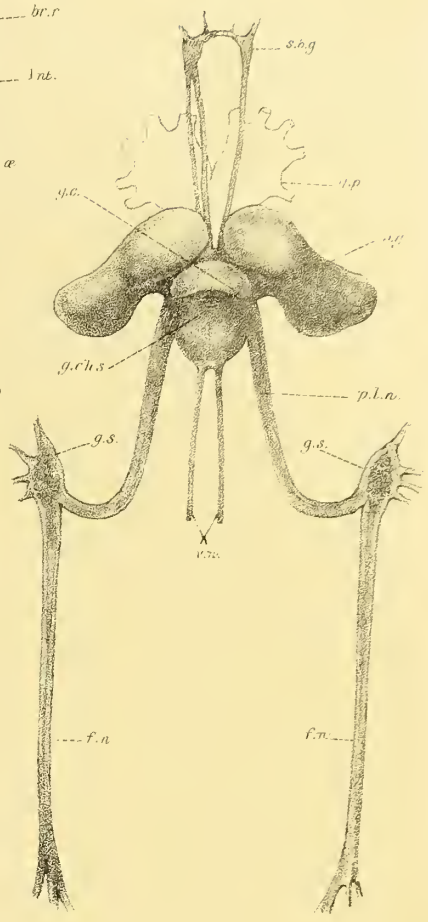


Fig. 6.

Fig. 5.

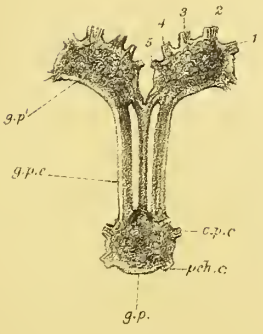


Fig. 3.

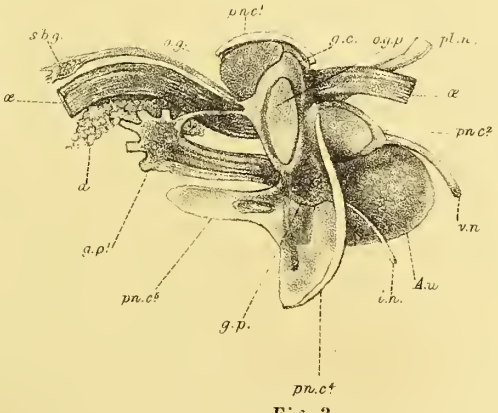
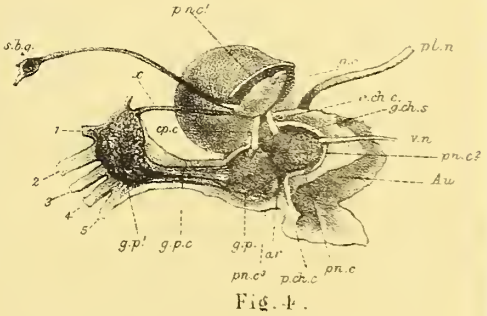


Fig. 4.



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SPIRULA PERONII.

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PLATE VI.

PLATE VI.

Spirula peronii.

Fig. 1.—The greater part of the alimentary canal, dorsal aspect ; × 4.

Fig. 2.—Ventral aspect of fig. 1, the liver removed.

Fig. 3.—The posterior part of the œsophagus, the stomach and commencement of the intestine ; the dorsal wall removed and also the extremity of the pyloric sac ; seen from within.

Fig. 4.—The pyloric sac seen from within.

Fig. 5.—The termination of the intestine with the small ink bag.

In all these figures :

a. Fold of the anterior face of the pyloric appendage.
ca. Cardia.
cr. Cardiac portion of the stomach.
cr'. Cæcal diverticulum of *cr.*
gl. Gastric ganglion.
hd. Hepatic duct.
li. Liver.
ov. Ova.
pc. "Pancreatic" cæca.
ps. Pyloric sac of the stomach.
ptn. "Peritoneal" sac.
py. Pylorus (*hy* in the fig.).
pyl. Pyloric valve.
r. Rectum.
z. Apparently glandular body in the fold of the "peritoneum."—Other letters as before.

Fig. 6.—Median longitudinal section of the buccal mass, left side.

db. Dorsal beak. *rd.* Radula.
li. Internal lip. *s.d.* Salivary duct.
ln. "Tongue."

Fig. 7.—Enlarged view of fig. 6, from the right side.—Letters as before.

Fig. 8.—Heart and neighbouring organs, *in situ*, dorsal aspect.

ao.a. ao.p. Anterior and posterior aorta.
aur. aur'. Right and left auricles.
br.h. br.h'. Right and left branchial hearts.
br.app. Branchial heart appendage (pericardial gland).
pl.v. Pallial vein.
v. Ventricle.
v.v. Abdominal vein.
x, x'. Right and left kidneys.—Other letters as before.

Figs. 9 and 10.—Acetabula, ventral and lateral aspects, × 100.

h. The horny lining. *pa.* Central papilla. *pd.* Peduncle.

Fig. 11.—The olfactory papilla.

Fig. 12.—The right eye from above.

c. Concentric circles of the iris. *m.* Muscles. *pp.* Pupilary aperture.

Fig. 13.—External (lateral) view of the right eye.

a. Optic nerve (between the removed optic ganglion and the eye).
ap. Palpebral or corneal aperture.
gl. Fatty gland.
oc. Walls of the ocular chamber.
pn.c. Perineural cartilage.
sc.lig. Sclerotic ligament.

Fig. 14.—A sagittal median section through the pallium of the posterior end of the body.

a. Papilla.
b. Edges of the fossa.
chr. Chromatophores.
ep. Epidermis.
l. Lenticular mass of fibrous tissue.
m. Layer of glassy-looking substance.
r. Layer of fibres proceeding from the centre to the circumference *r'*.
sp. Sponge spicule.
z. Point of the section, fig. 17.

Fig. 15.—Enlarged view of a part of fig. 14.—Letters as before ; at *y* the parts are obviously torn and otherwise injured.

Fig. 16.—Part of the lenticular body (*l*, fig. 14) much enlarged.

n. Nuclei embedded among the fibres.

Fig. 17.—Longitudinal antero-posterior section of the mantle.

E. Outer side. *I.* Inner face.

Fig. 1.
× 4

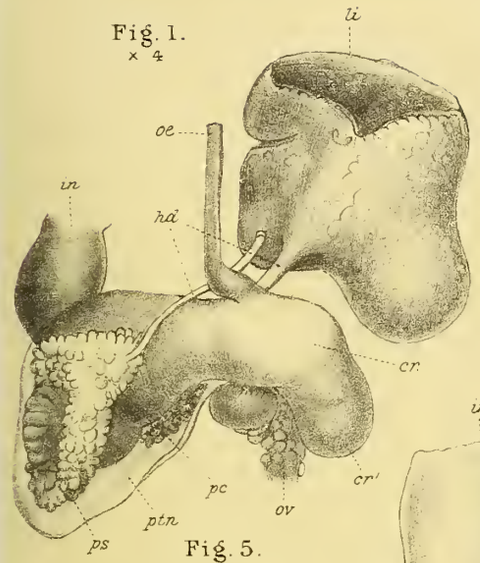

Fig. 8.
× 4.

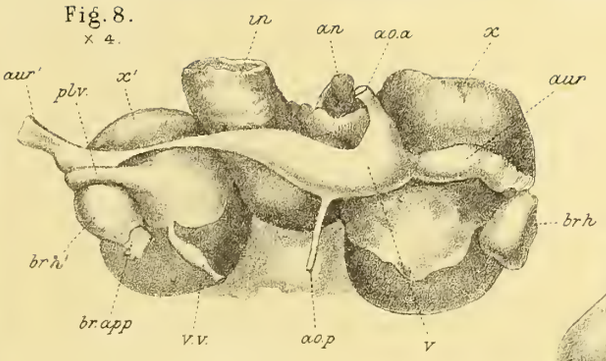

Fig. 2.
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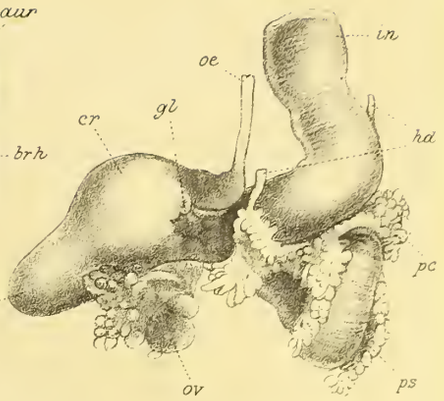

Fig. 3.
× 8

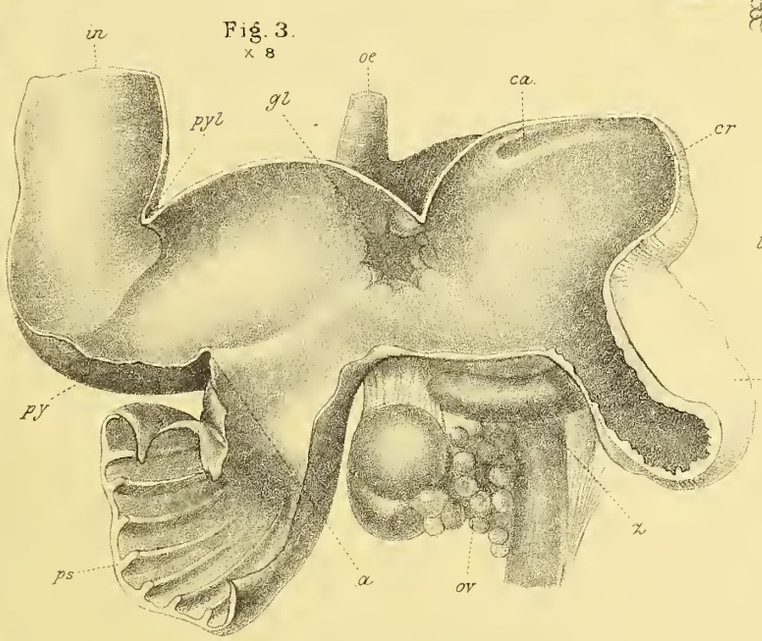

Fig. 5.
× 5.

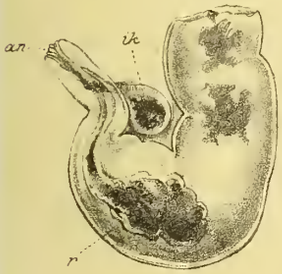

Fig. 6.
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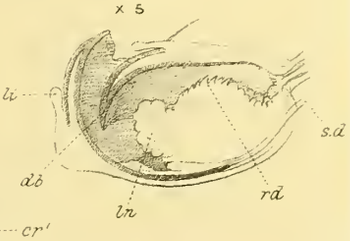

Fig. 10.

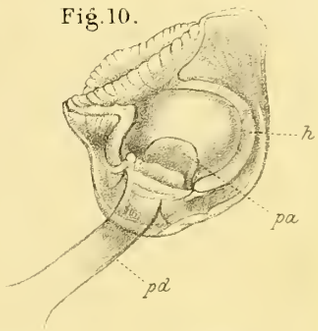

Fig. 9.

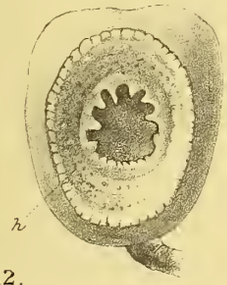

Fig. 7.
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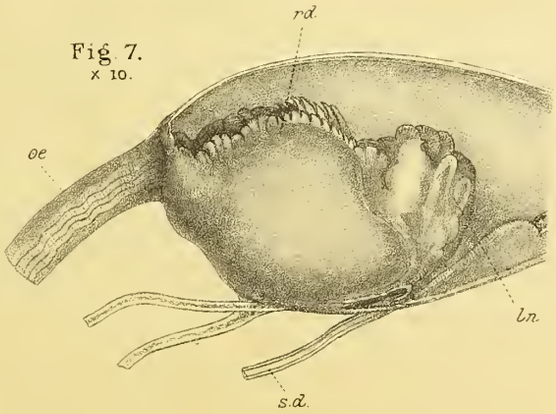

Fig. 4.
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Fig. 13.

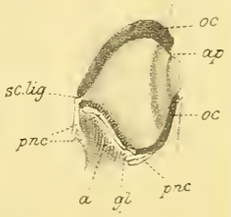

Fig. 12.

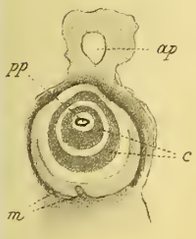

Fig. 11.
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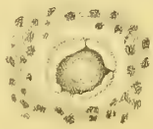

Fig. 17.

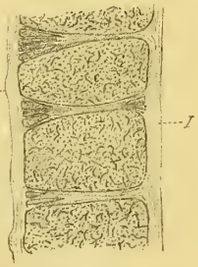

Fig. 16.

Fig. 14.
× 8

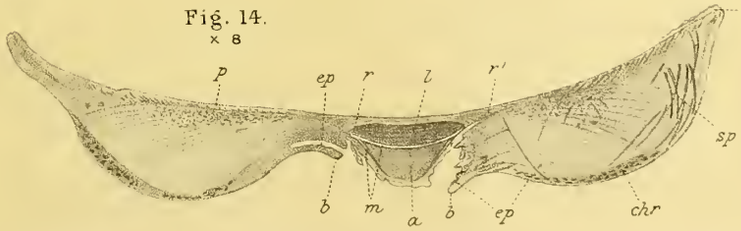

Fig. 15.
× 24.

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THE

VOYAGE OF H.M.S. CHALLENGER.

A SUMMARY OF THE SCIENTIFIC RESULTS.

APPENDIX (PHYSICS AND CHEMISTRY, PART VIII.)—REPORT ON OCEANIC CIRCULATION.

REPORT

ON THE

SCIENTIFIC RESULTS

OF THE

VOYAGE OF H.M.S. CHALLENGER

DURING THE YEARS 1872-76

UNDER THE COMMAND OF

CAPTAIN SIR GEORGE S. NARES, R.N., F.R.S.,

AND THE LATE

CAPTAIN FRANK TOURLE THOMSON, R.N.

PREPARED UNDER THE SUPERINTENDENCE OF

THE LATE

Sir C. WYVILLE THOMSON, Knt., F.R.S., &c.

REGIUS PROFESSOR OF NATURAL HISTORY IN THE UNIVERSITY OF EDINBURGH

DIRECTOR OF THE CIVILIAN SCIENTIFIC STAFF ON BOARD

AND NOW OF

JOHN MURRAY

ONE OF THE NATURALISTS OF THE EXPEDITION

A SUMMARY OF THE SCIENTIFIC RESULTS

APPENDIX (PHYSICS AND CHEMISTRY, PART VIII.)—REPORT ON OCEANIC CIRCULATION

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EDITORIAL NOTES.

One of the most important subjects brought into prominence by the contributions of the Challenger Expedition to the Science of Oceanography was that of Oceanic Circulation. It is possible to observe directly the rate and direction of the surface currents of the ocean, and, by means of current drags and other instruments, to gather some information with regard to the motion and direction of undercurrents at no great distance beneath the surface in some parts of the ocean, such as, for instance, the Strait of Gibraltar and the Bosphorus. In the greater depths of the ocean the motion of the water is too slow for observations of this nature, and it becomes necessary to trace movements by a study of the temperature and specific gravity of the ocean waters.

As the examination of the Challenger observations bearing on the question of oceanic circulation proceeded, it became apparent that a full discussion of atmospheric circulation was required as a necessary preliminary. Accordingly I induced Dr. Alexander Buchan to undertake the preparation of a Report on Atmospheric Circulation based on the Challenger and other available meteorological observations, and a Memoir on this subject was published five years ago. Shortly afterwards Dr. Buchan commenced the discussion of the data bearing on oceanic circulation, the most important of these being the Challenger observations. All other published data obtainable has been made use of in the discussion, and, in addition, a large amount of unpublished data was placed at Dr. Buchan's service by the Meteorological Council and by Admiral Wharton, Hydrographer of the Admiralty. The preparation of this Memoir has occupied the whole of the time at Dr. Buchan's disposal

during the past five years, and has been a peculiarly heavy piece of work. It involved a search for all available material, extracting the observations and reducing them to uniform standards, charting them thereafter on a large number of maps, a selection only of which are published with this Report. Much time was required in the preparation of the maps, Nos. I. and II., which exhibit the mean annual temperature and specific gravity of the surface of the ocean. The practice of including annual means in their published tables and maps of sea-temperatures and salinities has been hitherto seldom adopted by meteorologists, consequently it was necessary to calculate these means where possible, since it is from such alone that any satisfactory discussion of the temperature and specific gravity of the ocean at all depths can proceed.

The present Report is divided into two parts, the first dealing with the surface of the ocean, and the second with the deeper ocean waters. The former gives a brief *résumé* of those atmospheric conditions which bear on the question, particularly the distribution of pressure and the prevailing winds dependent on the pressure. Attention is pointedly drawn to the intertropical distribution of pressure and the area within this region where pressure is lowest, since the position of this area or band with reference to the equator appears to give the key to the solution of the problems under consideration, viz., whether any of the surface currents of the ocean, generated and maintained by the trade winds, cross the equator, bearing with them a high temperature and high specific gravity into another hemisphere than that in which they had their origin. The relation of the prevailing winds to the great currents of the ocean is pointed out as well as the relation of the rainfall to the specific gravities. The distribution of the temperature of the surface of the ocean and of its specific gravity is fully described and illustrated on the first two maps. On twenty-seven maps the temperatures of the sea at 10, 15, 20, 25, 30, &c., fathoms down to 200 fathoms were entered with the view of ascertaining approximately the depth

at which the influence of season is no longer felt on the open ocean. This depth was provisionally fixed at 100 fathoms, and it is of importance to note that at this and greater depths each observation of temperature and specific gravity may be treated as a good annual mean.

The second part of the Report examines the temperatures and specific gravities at depths from 100 fathoms to the bottom, their relations to the temperatures, specific gravities, and currents near the surface, and the horizontal and vertical movements of the ocean in this way indicated. The results, so far as now ascertained, point unmistakably to the necessity for further exploration of the Southern Ocean, the western half of the South Atlantic, and the Pacific from about long. 150° W. to the American coasts, before completely satisfactory explanations can be given for some of the phenomena pointed out in the Memoir.

It will be seen, however, that Dr. Buchan has made a most important contribution to knowledge, which will be welcomed by all who take an interest in the science of the sea.

The Report is illustrated by sixteen double-page maps. The manuscript was received by me in December 1894.

JOHN MURRAY.

CHALLENGER OFFICE, 45 FREDERICK STREET,
EDINBURGH, *January* 12, 1895.

THE

VOYAGE OF H.M.S. CHALLENGER.

PHYSICS AND CHEMISTRY.

REPORT on Oceanic Circulation, based on the Observations made on board H.M.S. Challenger, and other Observations. By Alexander Buchan, M.A., LL.D., F.R.S.E.

During the two or three years preceding the time when the Challenger left on her famous voyage, several large questions, both practical and scientific, affecting the general movements of the atmosphere and the ocean began to be discussed, with an intelligence and fulness new to the discussion of such questions. These discussions were occasioned by the correct deep-sea temperatures which then began to be obtained, and by a first approximate representation of the distribution over the earth of the mass of the earth's atmosphere, thus leading to a more accurate knowledge of the prevailing winds of the globe resulting from that distribution. At that time, any discussions that were attempted on the more fundamental problems of meteorology, relative to the diurnal and seasonal changes in atmospheric temperature, pressure, humidity, and wind, were really restricted to observations made on land. It was plain that data obtained exclusively from observations made on land, which occupies little more than a fourth part of the earth's surface, were inadequate to a right conception and explanation of atmospheric phenomena.

Accordingly, when the Challenger Expedition was fitted out in 1872, arrangements were made for taking, during the cruise, either hourly or two-hourly observations both of atmospheric phenomena and of the surface temperature of the sea; and in addition, elaborate observations of sea temperatures and specific gravities of the sea-water at all depths. Immediately on publication in the Preliminary Reports of the Expedition, the results of these observations were at once recognised to be of first importance in terrestrial physics, inasmuch as they opened up for discussion the broad question of oceanic circulation on a basis of accurate facts.

It became more and more evident, as the examination of the results was proceeded with, that, for a right understanding of the questions raised, a full discussion of atmospheric phenomena was required as a necessary preliminary. Now, of these

phenomena the most important is an approximately correct representation of the circulation of the atmosphere over the surface of the globe in all seasons of the year. The only way by which this knowledge can be obtained is by the geographical distribution of the mass of the earth's atmosphere, as shown by mean isobaric lines, which, as is recognised, ultimately depend on the geographical distribution of the temperature and humidity of the air. Observation abundantly shows that it is the isobaric lines which absolutely rule the direction of the prevailing winds.

A discussion, therefore, of all available information relative to the different atmospheric phenomena, with more special reference to the work of the Challenger, was undertaken in 1882, and the results were published in the beginning of 1890.[1] That Report gives, in addition to the results of the Challenger observations, the mean diurnal variations of atmospheric pressure at 147 places in all parts of the globe; the mean monthly and annual pressure at 1366 places; a similar table of mean temperatures at 1620 places; and the mean monthly and annual direction of the wind at 746 places. Owing to the all-importance of the wind on oceanic circulation, other data were obtained and utilised in constructing the maps, which had been published by the marine and meteorological departments of the United States, England, France, Holland, Germany, Norway, Denmark, Italy, Mauritius, and India. A first attempt was also made to investigate and describe the meteorology of the ocean.

Among the more important factors of ocean meteorology that bear more directly on this discussion are the large permanent anticyclonic areas over the oceans, out of which the winds blow in all directions towards and over all surrounding regions where atmospheric pressure is lower. These are the regions of the oceans where calms and light winds are of most frequent occurrence. Since this state of things necessarily implies vast accessions of air setting towards these anticyclonic regions as upper aerial currents, and thence slowly descending to the surface of the sea, it follows that in these regions the air is relatively very dry; and this being so, evaporation is very great, and the specific gravity of the surface water of the sea consequently also large in anticyclonic regions.

An examination of the anticyclones and their relative prevailing winds on the isobaric maps accompanying the Report on Atmospheric Circulation, already cited, indicate that these regions may be regarded, in a very large degree, as the ORIGINS OF THE WINDS and surface currents on the sea. It is of the greatest importance to note, in connection with the specific gravity of the surface water, that the less space the winds have traversed the ocean from their origins in the anticyclonic regions, the less is the rainfall. And on the other hand, the greater the distance the winds have traversed the ocean, the more copious is the rainfall. To take examples: The isobaric lines and winds for July show that the regions of the globe where at this time of the year the

[1] Report on Atmospheric Circulation, based on the Observations made on board H.M.S. Challenger, and other Meteorological Observations, by Alex. Buchan, M.A., LL.D. (Phys. Chem. Chall. Exp., pt. v., 1889).

rainfall is large, are India, the winds arriving there having really traversed the ocean from near latitude 30° S.; the United States, the winds arriving there after having traversed nearly the whole breadth of the Atlantic and the Gulf of Mexico; and more particularly China and Japan, on which coasts the winds arrive after having traversed more than half the breadth of the Pacific. The numerous East India islands scattered over the Western Pacific very largely, in proportion to their mountainous character, increase the rainfall, especially in the equatorial region. This greatly reduces the specific gravity of the surface waters, which, in turn, has important bearings on the distribution of deep-sea temperatures in the respective regions. The West India Islands have a similar influence in lowering the specific gravity of the surface over that portion of the Atlantic. On the east coast of South America the winds blow directly home on the continent, but, as they cross no extensive island groups on their way, the specific gravity of the sea is not reduced, as happens off the south-east coast of Asia. But to the south of Monte Video the prevailing winds are no longer from the sea, but they blow from the land seawards, being within the large region swept by the north-westerly winds of the southern hemisphere; and, as will appear farther on, with marked dissimilar effects on the temperature and specific gravity of the ocean off these coasts.[1]

[1] The temperature observations utilised in preparing the maps which accompany this Report are noted below :—

1. Report on the Deep-Sea Temperature Observations obtained by the Officers of H.M.S. Challenger, during the years 1873-76 (Phys. Chem. Chall. Exp., pt. iii., 1884).

2. Preliminary Report of the Scientific Exploration of the Deep Sea in H.M. Surveying-vessel "Porcupine," during the summer of 1869, conducted by Dr Carpenter, V.P.R.S., Mr J. Gwyn Jeffreys, F.R.S., and Prof. Wyville Thomson, LL.D., F.R.S. (*Proc. Roy. Soc.*, vol. xviii. p. 397, 1869).

3. Report on Scientific Researches carried on during August, September, and October 1871 in H.M. Surveying Ship "Shearwater," by William Carpenter, M.D., LL.D., F.R.S. (*Proc. Roy. Soc.*, vol. xx. p. 535, 1871).

4. The Annual Lists of Oceanic Depths and Serial Temperature Observations of the Hydrographic Department, Admiralty, London. In addition to these, Captain Wharton, the hydrographer, placed at my service all the unpublished data in the hydrographic office.

5. The Norwegian North Atlantic Expedition, 1876–78: the North Ocean, its Depths, Temperature, and Circulation, by Prof. H. Mohn, Christiania, 1887.

6. Three Cruises of the United States Coast and Geodetic Survey Steamer "Blake," in the Gulf of Mexico, in the Caribbean Sea, and along the Atlantic Coast of the United States from 1877 to 1880, by Alexander Agassiz, Boston and New York, 1888 (*Bull. Mus. Comp. Zoöl.*, vols. xiv. and xv.).

7. Reports on the Dredging Operations off the West Coast of Central America to the Galapagos, to the West of Mexico, and in the Gulf of California, in charge of Alexander Agassiz, carried on by the U.S. Fish Commission Steamer "Albatross," Lieut.-Commander Z. L. Tanner, U.S.N., commanding (*Bull. Mus. Comp. Zoöl.*, vol. xxiii. p. 1, 1892).

8. Deep-sea Sounding and Serial Temperatures in the North Pacific Ocean, obtained 1873-74 in the United States Steamer "Tuscarora," Commander George E. Balknap, Washington, 1874.

9. Report of the Results of the Survey for the purpose of determining the practicability of laying a Telegraphic Cable between the United States and the Hawaiian Islands, Washington, Government Printing Office, 1892.

10. The Exploration of the Gulf of Guinea, by J. Y. Buchanan (*Scot. Geogr. Mag.*, vol. iv. pp. 177 and 233, 1888).

11. Deep-sea Sounding: a Brief Account of the Work done by the U.S.S. "Enterprise" in Deep-sea Sounding during 1883-86, by Captain A. S. Barker, U.S.N., New York, 1892.

12. Journal of Hydrological Observations made by the Officers of the Corvette "Vitiaz" during a voyage of Circumnavigation, 1886-89, by Admiral S. Makaroff, Admiralty, St Petersburg. (The proof sheets of the forthcoming volume of the Cruise of the "Vitiaz" have been kindly forwarded by Admiral Makaroff with permission to use the observations in this investigation).

13. Berichte der Commission für Erforschung des östlichen Mittelmeeres, Zweite Reihe (*Denkschr. d. K. Akad. Wiss. Wien*, Bd. lx.).

Lieutenant Baillie, Marine Superintendent of the Meteorological Office, obligingly re-drew for me a map, which he had prepared for Longman's New Atlas, 1889, showing the mean annual temperature of the surface of the ocean. This map I have revised and amplified from observations, in which mean annual values are given, or data from which they can be calculated, published by the Meteorological Council of London, the Scottish Meteorological Society, and the German, Norwegian, Danish and Dutch Meteorological Institutes. The parts of the ocean thus dealt with are the Gulf of Mexico, the Atlantic from lat. 20° N. to 5° S., round the south of Greenland, round Iceland, Norwegian Sea and Arctic Ocean, North Sea, Mediterranean, Red Sea, Persian Gulf, west of Arabian Sea, east of Africa from Cape Guardafui and round the Cape to near Whalfisch Bay, and south of Australia. Since this discussion deals with the temperature at depths where the influence of season is virtually not felt, it was absolutely essential that it should start from the mean annual temperature of the surface. It is evident that mean temperature for a single month, or groups of months that do not represent an annual mean, would simply mislead.

The *specific gravities* are those observed by the Challenger, reduced by Mr Buchanan, and published in the Challenger Reports,[1] together with the specific gravities given in the publications enumerated above as the sources from which the sea temperatures were obtained. The specific gravities given in the account of the Cruise of the "Novara" (Wien, 1862–65) have also been utilised, and also those given in the following publications of the Meteorological Council of London: Charts of Meteorological Data for Square 3, lat. 0°–10° N., long. 20°–30° W.; Charts of Meteorological Data for Nine Ten-Degree Squares, lat. 20° N. to 10° S., long. 10° to 40° W.; Meteorological Charts for the Ocean District adjacent to the Cape of Good Hope; and Twelfth Number of Meteorological Papers, published by authority of the Board of Trade. Professor Copeland has favoured me with a valuable unpublished series of specific gravities observed by him in the South Atlantic, west of Cape Colony, and thence round the Cape and through the Indian Ocean to a point a little to the south of Mauritius. When these observations of specific gravities had been entered in their respective positions on the maps, large sections of the ocean were found to be altogether unrepresented. These blanks, however, have been very largely filled up through the courtesy of the Meteorological Council in placing at my service their rich storehouse of observations not yet published. With these data the specific gravity of the surface of the oceans is fairly well represented.

14. Exploration of the Faroe Channel during the summer of 1880, in H.M.'s hired ship "Knight Errant," by Staff-Commander Tizard, R.N., and John Murray (*Proc. Roy. Soc. Edin.*, vol. xi. p. 63).

15. Deep-Sea Exploration in Faroe Channel by H.M.S. "Triton" in 1882, commanded by Staff-Commander Tizard, R.N. (Admiralty Blue Book).

[1] Report on the Specific Gravity of Samples of Ocean Water, observed on board H.M.S. Challenger during the years 1873–76, by J. Y. Buchanan, M.A., F.R.S.E. (Phys. Chem. Chall. Exp., pt. ii., 1883).

As regards the depths of the sea dealt with in this Report, the observations were entered in their places on the separate maps ; but it is right to state that at none of these depths, not even the 100 fathoms depth, are the observations sufficiently numerous to warrant the drawing of lines of equal specific gravity, except for comparatively restricted areas of any of the oceans. The standard temperature of 60° Fahr. adopted by Mr Buchanan in his Report has been employed, the standard density being that of distilled water at 39°·2 (4° C.). In all cases where the specific gravities have been published in accordance with other standards, they have been reduced to the above standard. The specific gravities taken from the publications of the Meteorological Council are all average specific gravities, many of them being the means of numerous observations, and on this account they are the best data at present available. By help of the numerous specific gravities observed by Admiral Makaroff in his cruise, and published *in extenso* by him, good averages were also obtained for portions of the route traversed by the "Vitiaz."

The influence of the protracted rainfall of the summer monsoon on the one hand, and virtually rainless weather tracks on the other, strongly impress their specific gravities over wide regions. The whole of the sea off Southern Asia, from Ceylon round to the Chinese Sea and northwards, during the summer months indicate specific gravities much lower than occur anywhere else on the globe in similar latitudes, being occasioned chiefly by the heavy rains of the summer monsoon on the coasts.

On the other hand, all the data entered on the maps for depths of 100 fathoms and greater depths were simply single observations of specific gravity, and the same remark applies to the temperatures employed in constructing the maps. Specific gravities thus obtained, as well as single temperatures from the same depths, may be truly regarded as good annual means.

There were really no correct observations of deep-sea temperatures till the Miller-Casella thermometer, and similar thermometers having their bulbs protected from outside pressure, came to be employed. For some time it was concluded that, even with bulbs so protected, it was necessary to reduce the observed readings, the rate proposed by Captain Davis being 0°·5 Fahr. for every mile of descent from the surface ; and in accordance therewith the whole of the temperatures published in the seven Preliminary Reports of Ocean Soundings and Temperatures obtained by H.M.S. Challenger, 1873-76, were corrected.

After the return of the Challenger the thermometers used during the Expedition were handed over to Professor Tait, with a view to "the reduction of the deep-sea observations which were made on board the Challenger, in so far as these are affected by pressure." The investigation, with the results, is published in the Challenger Reports.[1]

[1] Report on the Pressure Errors of the Challenger Thermometers, by Professor P. G. Tait (Narr. Chall. Exp., vol. ii., Appendix A, 1882).

A summary of the results is given in that paper at page 42, where it is shown that at a depth of 2500 fathoms, or nearly 3 miles, the mean correction of all the thermometers examined is only 0°·27 Fahr., the largest correction of any one of these thermometers being 0°·41 Fahr.

The observations of deep-sea temperatures strictly as observed, no correction being thus shown to be needed, are published in the Challenger Reports, together with the same temperatures represented by curves on 258 plates.[1] The curves are drawn, *libera manu*, through the observations, which are fully detailed at the top of each plate, allowance being thus made for such errors of observation as 10°, 5°, 1°, &c. The figures adopted in constructing the accompanying maps of deep-sea temperature are taken directly from the curves. In dealing with the other observations employed in this discussion, the observations as read are alone employed, any correction for pressure on the bulbs of the thermometers being in no case allowed for. As regards the important series of observations made by Commander Belknap, U.S.S. "Tuscarora," it is stated in his Report, p. 18, what corrections were applied to the thermometers for depths of 100, 300, 500, and 700 fathoms, but no further explanation is given. An examination, however, of the observations themselves at all depths as printed makes it sufficiently plain that Captain Davis' correction of half a degree Fahr. for each mile of depth had been applied throughout. Before, therefore, entering the temperature observations of the "Tuscarora" on the maps, they were *increased* by the amount by which they had manifestly been diminished, before publication, by the application of Captain Davis' rule. It was interesting to note that when the "Tuscarora's" course was in the vicinity of the course of the Challenger, "Egeria," &c., the additions made to the published readings brought them into accordance with the readings of these other ships.

As this discussion deals only with depths at which the temperature is virtually uninfluenced by season, no depths less than 100 fathoms are examined. The temperature maps which accompany this Report are for depths of 100 fathoms, and then, in succession, for each additional 100 fathoms down to 1000, then for 1500, for 2200 fathoms and another for bottom temperatures. It is plain that in this discussion no temperatures of the surface of the sea are admissible except good mean annual temperatures of the surface, it being these and these alone that rule deep-sea temperatures. Hence it is impossible to overestimate the value of Lieut. Baillie's map showing the mean annual distribution of the temperature of the surface.

In order to arrive at a correct knowledge of the mean temperature of the ocean considered as a whole at each of the depths selected, all the temperatures at each depth were averaged, excluding the temperatures which are from so-called "closed areas." The mean temperature thus arrived at is entered on each map, and in drawing the isothermal lines, all temperatures above this mean are represented by red lines, and

[1] See *Ante*, No. 1, footnote, p. 3.

temperatures below it by black lines. These lines thus show graphically for each depth the regions where the temperature is above the average for that depth and where it is below it.

The most striking fact revealed by deep-sea observations of temperature is the very low temperature of the ocean at great depths in all latitudes, this being but a little way above the freezing-point of fresh water. To show this feature more exactly, a map was constructed indicating the temperature at the depth of 2200 fathoms. The average of all the observations made at this depth give a mean temperature of 35°·2. Another map has been constructed (Map 14) on which are entered the differences of the individual temperatures from this average, those which exceed it being entered in red ink, and those under it in blue ink. The result is interesting and instructive.

Everywhere over the Indian Ocean temperatures at 2200 fathoms are under the mean. There are twenty observations whose mean temperature is 34°·4, being thus 0°·8 lower than the general ocean at this depth. Over the whole of the South Atlantic to the south of lat. 10° S. temperatures are also under the mean, slightly in the eastern side of the ocean but very largely in the south-west of it. At three stations to the east of Buenos Ayres between longitudes 35° and 45° west the temperature is only 32°·6, which is the lowest yet observed in any part of the ocean not within a " closed area " ; that is, in a position shut off by submarine ridges from the general oceanic circulation. It is highly probable that temperatures even lower may yet be observed off Cape St. Roque, where 32°·2 has been observed at a depth of 2537 fathoms. Temperature is also under the mean over the whole of the Pacific Ocean, except (1) to westwards of a line drawn from the south and west of Japan to the north of New Zealand ; and (2) over a large section of that ocean enclosed within a line passing from Valparaiso and curving round by about Marquesas Islands to Acapulco, though it must here be stated that observations are wanting from Valparaiso to Galapagos in and over the central parts of this region. Future soundings will probably show that these are areas shut off by a low enclosing ridge at the bottom. The lowest temperature in the Pacific is 33°·2, or 2°·0 under the mean, a little to the south of Kamtschatka. Temperatures nearly a degree under the mean have been observed off Alaska, San Francisco, to the north-east of New Zealand, and in about lat. 40° S. and long. 107° W. But throughout the cold area of the Pacific generally the deficiency below the mean temperature of the oceans is extremely small. Thus, leaving out the small areas where temperature is nearly a degree under the mean, the mean temperature of the remaining sixty-three stations is 35°·0, or only 0°·2 under the mean temperature of the whole ocean at that depth. Speaking generally, the temperature of the Pacific at 2200 fathoms closely approximates to the average of the ocean taken as a whole at this depth.

The temperature of the North Atlantic is everywhere above the average of the whole ocean, and the amounts of excess are for the great depths in all cases large. In

this ocean, temperatures have been observed at fifty-five stations, the mean of these being 36°·4, or 1°·2 above the average, thus showing a strikingly marked difference between the deep-sea temperature of the Indian Ocean and the South Atlantic on the one hand, and the North Atlantic on the other. The two sections of the Pacific Ocean where the temperature is above the average do not show any such excess as appears in the North Atlantic, the excess above the average being, roughly speaking, about half a degree. The mean of the two stations in the China Sea is 36°·5, or 1°·3 above the average.

In connection with deep-sea temperatures the following facts are interesting. In the Arctic Ocean, at a depth of 2005 fathoms, Professor Mohn observed a temperature of 29°·6 in lat. 68° 21′ N. and long. 2° 5′ W. This position, however, is in a "closed area," shut off from the general oceanic circulation by the Wyville-Thomson Ridge. A little to the south of Greenland, at 1860 fathoms, 33°·4 has been observed; and ten degrees to westwards, at 1750 fathoms, 34°·0. To the east of Ceylon, at 2020 fathoms, 33°·9 was observed, lat. 9° N. and long. 85° E., and to north-west of Madagascar, at 1877 fathoms, a temperature of 33°·5 has been noted. On the other hand, to the east of Australia, lat. 19° S. and long. 165° E., at a depth of 2525 fathoms, the temperature was found to be 36°·4. It will be seen, when the bottom temperatures are dealt with, that the Atlantic stands alone among the oceans for relatively high temperatures at great depths.

It is remarkable that at the depth of 2200 fathoms the water of the sea falls to its lowest temperature off the east of the Argentine Coast of South America, and is nearly, if not quite, at its highest off the east coast of North America, thus pointing to very diverse conditions in the oceanic circulation off the east coasts of these two continents.

The striking fact is that deep-sea temperatures in all latitudes, equatorial as well as polar, are uniformly low, and, except in a few restricted regions, do not differ from each other more than about two degrees. The exceptional regions are where the Sea of Okhotsk meets the ocean; the whole of the deep water immediately to the east of South America from Cape St Roque to Grahame's Land, in Antarctica; and, in a less degree, the southern portion of the Indian Ocean. It is also to be noted that the lowest deep-sea temperatures are found in those parts of the ocean which lie in the Southern hemisphere, and that, on the whole, higher temperatures are encountered as we recede from the Antarctic region. It may also be pointed out that the lower deep-sea temperatures extend farther to the north from the Southern Ocean, just over those depths of the sea which appear to have, and probably do have, a direct communication with the south; that is, are not cut off by any intervening submarine ridge separating them from the cold waters of Antarctica.

There can be no doubt that these very low deep-sea temperatures have their origin in the Southern or Antarctic Ocean, the icy-cold waters of which are propagated north-

wards, the rate of propagation being so slight as to be regarded rather as a slow creep than as a distinctly recognisable movement of the water. It is evident that the increase of temperature from the bottom of the ocean to the surface is due to the slow descent of the warmer water of the surface carrying downwards their higher temperature to greater depths.

The following mean temperatures, calculated from the whole of the observations in all latitudes for the different depths, show the rate of diminution of the temperature downwards :—

Depth in Fathoms.	Temperature.	Depth in Fathoms.	Temperature.
100	60°·7	900	36°·8
200	50°·1	1000	36°·5
300	44°·7	1100	36°·1
400	41°·8	1200	35°·8
500	40°·1	1300	35°·6
600	39°·0	1400	35°·4
700	38°·1	1500	35°·3
800	37°·3	2200	35°·2

Thus the fall of temperature from 100 fathoms to 2200 fathoms is 25°·5, and of this there is a fall of 10°·6 from 100 to 200 fathoms. For each successive 100 fathoms the falls of temperature are 5°·4, 2°·9, 1°·7, 1°·1, 0°·9, 0°·8, 0°·5, 0°·3, 0°·4, 0°·3, 0°·2, 0°·2, and 0°·1, and for the 700 fathoms from 1500 to 2200 fathoms the mean fall is only the tenth of a degree.

Prevailing Winds over the Ocean.

These will be best studied in detail by referring to the Report on Atmospheric Circulation, pp. 48–69, and the maps 27–52, which show the isobaric lines and prevailing winds of the globe for the months and the year. In these maps the general movement of the atmosphere over the different oceans through the months of the year is clearly shown. The outstanding features of the circulation of the atmosphere bearing on this discussion will be seen in an examination of the prevailing winds in January and July.

January.—In the North Atlantic, north of about lat. 35° N, atmospheric circulation is ruled by the low pressure about Iceland, in conjunction with the high pressure over North America on the one hand and Eurasia on the other. From this geographical distribution of the mass of the earth's atmosphere, it inevitably follows that over the east coast of America the prevailing winds are north-westerly, and over Western Europe south-westerly. Hence the prevailing winds at this season blow the surface waters of

the ocean from the American coast and West Indies across the Atlantic, then northwards over its eastern side, and thereafter round the north of Norway and along the north of Siberia. This state of things results, as regards Europe, in the setting-in of a strong ocean current bringing the waters of warmer latitudes to its western shores, and on the other hand, as regards America, the draining away from its shores of its warmer surface waters, and as this water is replaced by the upwelling of the water from greater depths, it is therefore of a lower temperature than that removed by the surface current.

Similarly, the wind system of the North Pacific is ruled by the low pressure in the north of that ocean, resulting in north-westerly winds in the east of Asia and south-westerly and southerly winds in the west of North America. The great dryness and low temperature of these north-westerly winds have the effect of lowering to a still greater degree the temperature of the North Pacific Ocean.

In the southern hemisphere, south of lat. 35° S., there occurs no circumscribed region of low pressure, but a broad ring, in width about 30° of latitude, of very low pressure, passes completely round the globe, falling to a mean pressure of about 29·000 inches near lat. 63° S. Over this broad space of low pressure the prevailing winds are strong, and approximately west or north-westerly all the year round. These strong north-westers pour south into the Southern Ocean, by the surface currents they generate and maintain, inconceivably enormous volumes of water from lower latitudes, and these waters, be it noted, of a comparatively high temperature and specific gravity. These warm and specifically heavy waters in their passage southward by and by necessarily sink to greater depths, and are overlaid by the cold and specifically light waters from the melted snow and icebergs of the Antarctic region, as suggested by Dr Murray.[1] A striking feature of the waters of the Southern Ocean is the interdigitation of currents differing very widely from each other both in temperature and specific gravity, the colder of these currents having their origin, doubtless, in the numerous icebergs of these regions. An important part played by these vast currents of warm and specifically heavy water is to mitigate, most materially, the cold of the Antarctic region, particularly at great depths, and thus restrict the ice-clad area to its present limits.

At this season, south of the equator, systems of low atmospheric pressure are not situated over the ocean but over the land. Of these systems there are three,—in South America, South Africa, and Australia. The most pronounced of these is in Australia, and the result is that, on all coasts, winds blow from the sea upon the land, and at the same time the surface currents of the ocean are directed towards the land.

July.—In this season the geographical distribution of pressure is exactly the reverse in Australia of what obtains in January. Everywhere it increases on advancing from the coast into inland regions. The lowest pressure, about 30·000 inches, occurs near

[1] The Renewal of Antarctic Exploration, by John Murray, Ph.D., LL.D., of the Challenger Expedition (*Geogr. Journ.*, vol. iii. p. 18, 1894).

the north coast, and the highest, 30·180 inches, over the basin of the Murray River and its affluents. From this region the diminution in pressure is uninterrupted to the north, even as far as the low-pressure system of Central Asia. Hence, the prevailing winds of Australia are essentially an outflow from the high pressure of the interior towards the lower pressure of the coasts, particularly the north coast, and these winds are S.E. on the north coast, S.W. at Brisbane, W.N.W. at Sydney, N. at Melbourne, and N.E. at Adelaide. The high pressure of the south of Australia is continued westwards in the same latitudes through the Indian Ocean. From these latitudes (about lat. 30° S.), pressure falls continuously northward to the low pressure of Central Asia, and, following inevitably that diminution of pressure, southerly winds sweep across that ocean home into Asia. Where they touch the coast after traversing a great extent of the ocean, such as the coasts of the Bay of Bengal, they bring with them a heavy rainfall, which, from the lowering of the specific gravity thus occasioned, has an important retarding effect on the vertical circulation of the ocean there. On the other hand, on the northern and western parts of the Arabian Sea, the rainfall is exceedingly small, as the winds there have traversed but a small breadth of the ocean, and consequently, from the dryness of these winds, the specific gravity is much increased, and the vertical circulation becomes thereby accelerated.

Similarly, as pressure diminishes from about lat. 25° S. in the Pacific uninterruptedly to the low pressure of Central Asia, the southerly winds on the south-eastern coasts of Asia, after having traversed a wide extent of ocean, pour a heavy rainfall on these coasts and outlying islands, thus lowering greatly the specific gravity of the surface during the warm months.

The winds of Europe are determined by the high pressure of the Atlantic in its relations to the low-pressure systems of Asia and Africa at this time. On the coasts of Spain and North-West Africa the prevailing winds are northerly ; farther to the north, on the coasts of France and the British Islands, south-westerly ; and on the coast of Norway westerly and north-westerly. The curving of the winds round the anti-cyclone of the North Atlantic, from the N.E. off the coast of Africa, to E. and S.E. in the region of the West Indies, to S. and finally S.W. off the Eastern States of America, has all-important bearings on the circulation of the waters of that ocean.

The centre of lowest pressure in North America is over the States about Utah, from which pressure rises all round, but chiefly to the south-east and west. In accordance with this arrangement of the pressure, the winds blow from the Gulf of Mexico home to the coasts of the States as southerly winds. On the other hand, the winds on the coasts of the Pacific States are N. and N.W. as far north as Vancouver, but over that island, and along the coasts to northward, they are S.W.

From lat. 30° S. to lat. 63° S. pressure, as already explained, diminishes uninterruptedly from 30·150 inches to 29·000 inches, over a broad ring going round the

whole globe during all seasons of the year. Over the whole of this vast space westerly and north-westerly winds sweep as strong winds, subject to little, if any, variation with season. From the enormous quantities of warm waters they impel before them into the Southern Ocean, they may be regarded as playing the most conspicuous part, of all the prevailing winds, in the circulation of the waters of the ocean.

Specific Gravity of the Ocean. (Map 1.)

Of all oceans the South Atlantic is the one containing fewest islands, and it is traversed by virtually the same winds at all seasons of the year. In that ocean, accordingly, the distribution of the specific gravity of the surface is presented in its simplest form. From the equator to the estuary of the Rio de la Plata the prevailing winds are south-easterly trades. It is also to be noted that these winds blow from higher to lower altitudes, and consequently from regions of lower to regions of higher temperatures (see Map 2). From these conditions result a drier atmosphere, increased evaporation from the surface of the sea, and a small rainfall, much smaller than would otherwise be, owing to the almost total absence of islands which would, in proportion to their height, condense the aqueous vapour into rain, and thus lower the specific gravity in this ocean. Hence, the specific gravity increases on nearing the South American coast, attaining the maximum, 1·0275 to 1·0278, from Bahia to Rio de Janeiro. Off the west coast of Africa, in the same latitudes, specific gravity is much lower, even though that coast, from lat. 10° to 30° S., is one of the driest regions of the globe, much drier, indeed, than the corresponding coast of Brazil. This is due to the fact that the prevailing westerly winds on that coast are but the in-draught from the sea towards the heated land of Africa, and, necessarily, owing to the distribution of pressure, they extend only a short distance westwards into the Atlantic. Further, as the whole wind-system, together with the surface currents of this portion of the South Atlantic, is drifted westward by the south-east trades, there is an upwelling along the more easterly portion of the ocean to make good the surface drain, and the specific gravity of this deep water brought to the surface is much lower than that of the surface waters to the westward owing to the large evaporation of this region, to which these surface waters are subjected during their long course over this ocean.

On the other hand, the North Atlantic presents features strikingly different. For a considerable portion of the year northerly and north-westerly winds set in on the north-west coast of Africa, and, since they have traversed a considerable extent of the Atlantic, and have been steadily advancing into warmer latitudes, that region is characterised by a specific gravity higher than anything observed off the coast of South Africa. Again, the north-east trades do not blow home on the shores of the Eastern States of America. On the contrary, the north-east winds from the anticyclone of the North Atlantic curve

round to east, south, and, finally, to the south-west as they sweep over the West Indian Islands and past the east coasts of the States. The result is that a generous rainfall is deposited over the Eastern States, and on the western portion of the Atlantic adjoining. Thus, the specific gravity there is reduced, and it is still further reduced by the upwelling set in along that coast by the south-westerly winds blowing seawards from the land.

These south-westerly winds pass northwards over the Atlantic, more particularly its eastern half, at all seasons, carrying with them their higher temperature and specific gravity. This is seen in the most impressive manner by the extraordinary protrusion northwards of the specific gravity line of 1·0260 which reaches the latitude of about 72° N. In the North Pacific the northern extension of this line stops at lat. 34° N., or nearly 40° short of its position in the Atlantic.

In the closed basin of the Gulf of Mexico, which is virtually cut off from the great wind system of the North Atlantic, the specific gravity of its eastern half is 1·0271. Again, in the closed area of the Mediterranean the specific gravity rises to 1·0280 in the western basin, and to 1·0290 in the eastern basin. Further, in the Red Sea, which is more effectually closed to the ocean than either of the above seas, the specific gravity rises from 1·0275 at the Straits of Bab-el-Mandeb successively to 1·0310 near Suez, being the highest known mean specific gravity anywhere observed on the surface of the sea.

Of all the great oceans, the North Pacific shows by far the lowest specific gravity on the surface. The two regions of highest specific gravity, and they are comparatively of small extent, are marked off by the line of 1·0265. During the whole year, but especially the summer months, the rainfall over the western half of this great ocean is large, being occasioned both by the many high islands that the prevailing winds meet in their course, and by the low barometric gradients characterising this region, resulting in calms and light winds, to which this ocean owes its name, and a larger rainfall and less evaporation than would otherwise be observed. Further, as this ocean on its northern side is really a closed basin, neither the prevailing winds nor the ocean currents they generate cross into the Arctic Ocean, but re-curve round on the coast of America from lat. 50° N. southward. Hence over the whole of that part of the North Pacific skies are more clouded, rainfall larger, and evaporation and specific gravity therefore less.

In the South Pacific the area of high specific gravity is large, extending from South America across the whole breadth of the ocean. The region of highest specific gravity, 1·0270, is confined to the eastern half of the ocean, the specific gravity of the western half being reduced from like causes to those which lower the specific gravity of the western half of the North Pacific.

The Indian Ocean exhibits several marked peculiarities of its own. Owing to the arid climates of Arabia and adjoining regions, and the high specific gravity of the Red

Sea, the specific gravity of the Arabian Sea is high, but everywhere else to the north of lat. 10° S. it is rather low, owing no doubt to the large and, over wide areas, heavy rainfall occurring there. For a considerable portion of the year the prevailing winds of West and North Australia are from the sea, where barometric pressure is much higher than in the interior of the continent, and consequently the specific gravity is higher for some distance round these coasts. Similarly, over the western half of this ocean the prevailing winds blow home on the coast of Southern Africa, in the interior of which in the same months pressure is also low, and, just as happens off South America, the specific gravity is largest on the coast to the south of the latitude of Madagascar, which lies quite open to the ocean. The deflection of the lines round the South African coast is very interesting in connection with the well-known warm and cold ocean currents which are so striking a feature of that part of the globe. Fortunately, these lines are drawn from good annual mean specific gravities, calculated from numerous observations made during each of the twelve months of the year, which have been published by the Meteorological Council. It will be observed that the highest specific gravities of the Indian Ocean are found in the region of the anticyclones of that ocean, just as occurs with respect to the other oceans, particularly the Pacific Ocean.

The lower specific gravities observed in central Atlantic, between the higher specific gravities of the North and South Atlantic, are also annual averages, based on numerous observations, and mark with great distinctness the region between the two trade winds. It will be observed that in this region from long. 30° W. the specific gravity constantly diminishes eastward to the head of the Gulf of Guinea, where it falls below 1·0260, being lower than occurs anywhere on the coasts from the English Channel to the Cape of Good Hope.

The region of lowest specific gravity anywhere hitherto observed is the southern part of the Sea of Okhotsk where the mean falls to 1·0240, as calculated from numerous observations made there by Admiral Makaroff on board the "Vitiaz," and the next lowest between Greenland and Spitzbergen, where Professor Mohn, also from numerous observations, gives the low mean specific gravity of 1·0245. The mean of the ten observations made by the Challenger to the south of lat. 60° S. is 1·0247, and of the six of these made near to or to the south of the line of 1·0245 on Map 1, the mean is 1·0245, being the same as Mohn's line of least mean specific gravity. The low specific gravities round the southern part of South America are occasioned, on the west coast chiefly, by the heavy rainfall of that region, and on the east coast, in addition to the rainfall, by the upwelling there resulting from the strong westerly winds blowing from the land seawards.

Mean Annual Temperature of the Surface of the Ocean. (Map 2.)

In this map, showing the mean annual temperature of the surface of the ocean, the deeper red shaded portions indicate those regions where the temperature is highest, or where it exceeds 80°.

The area of high temperature does not quite circle the equatorial region of the globe, as it does not occur in the Pacific from long. 117° to 140° W. In the Atlantic and eastern portion of the Pacific, these areas of high temperature lie north of the equator, which is due to the circumstance that in these parts of the ocean the south-east trades protrude north of the equator, being the simple result of the geographical distribution of atmospheric pressure there. Quite different is it in the western division of the Pacific where this area of high surface temperature extends east of Australia as far south as lat. 20° S. This striking extension southward of the temperature is occasioned by the circumstance that, for eight months of the year, the line of lowest barometric pressure is there to the south of the equator, and, necessarily, accompanied by northerly winds, which propel into more southern regions the warmer waters of the surface. The point here insisted on is vital to the whole question of oceanic circulation.

Another important result of the geographical distribution of atmospheric pressure in the Atlantic and Pacific is that in the Atlantic the north and south trades are stronger and more persistent than those of the Pacific, and the inter-space between them characterised by calms and very light variable winds is therefore much narrower in the Atlantic than in the Pacific. From this it follows that the region of highest surface temperature in the Atlantic is comparatively much contracted in width, whereas in the Pacific it occupies a breadth nearly four times greater.

To the north of lat. 13° S. the area of maximum surface temperature overspreads the whole of the Indian Ocean, including the Arabian Sea and the Bay of Bengal, except the north-western portion of the Arabian Sea. This comparatively low temperature over the western division of the Arabian Sea is brought about by the prevailing north-westerly winds there in the summer and also the winter months, which drive the warm surface water to the south-eastwards, and thus bring, by upwelling, the colder waters of lower depths to the surface. The effect is well seen in the mean monthly temperature of the surface of the sea off the Arabian coast about long. 57° E., which, during the spring months, is 82°·8, but falls in the summer months to 76°·3 when the N.W. winds are strongest, rising again in the autumn to 79°·4. This low summer temperature is the more remarkable since the north-west winds which then prevail come from the deserts of Arabia, and are therefore hot, dry and rainless till they have traversed the sea a considerable way to the south-east. On the other hand, the prevailing winds at this season at the head of the Bay of Bengal are southerly and

south-easterly. They therefore blow home on that coast, bringing from tropical regions the warm waters of the surface over the whole of the northern portion of this sea.

On the western part of the North Atlantic the isothermal of 75° is carried to a higher latitude than anywhere else in the ocean, owing to the prevailing southerly and south-westerly winds, which carry thither the high temperature waters immediately to the south. On the other hand, the isothermal of 45° is carried to a lower latitude near Nova Scotia than anywhere else in the ocean, owing to the prevailing north-westerly winds there in the cold months of the year, and the cold currents that later on descend on these coasts from the Arctic regions. The isothermal of 45° is further remarkable in that it extends over a far larger number of degrees of latitude than any other isothermal, viz., from lat. 45° to 68° N., or twenty-three degrees of latitude.

A marked feature of the distribution of the temperature of the North Atlantic is the crowding of the isothermals off the coast of America, and their opening out into higher latitudes as they approach Europe and to lower latitudes as they near Africa. Thus on the American coasts the isothermals from 45° to 75° extend over twelve degrees of latitude, but on the eastern side of the Atlantic to forty-eight degrees. An important point is that the highest temperature as regards latitude is not near the coast, but in the ocean a considerable distance to westwards. The lowering of the temperature off the north-west of Africa deserves attention, as being the direct result of the curving round of the prevailing winds in this part of the North Atlantic anticyclone to north-west and north, thus transferring the surface waters from higher to lower latitudes. A similar effect is even more emphatically expressed in the isothermals of the air in this part of the ocean (see Map 13 in the Report on Atmospheric Circulation). A similar lowering of the temperature, from similar causes, is seen off the west coasts of all the continents, the prevailing winds in these regions passing from higher to lower latitudes. On the other hand, as the prevailing winds on the western sides of the oceans pass from lower into higher latitudes, temperatures there are higher, except in the higher latitudes, where icebergs and icefloes, polar currents, and upwelling occur.

The warm currents to the east of South Africa, and the cold currents to the west, are well shown on Map 2, on which the results are now stated with great accuracy of detail from the Meteorological Charts for the Ocean District adjacent to the Cape of Good Hope, issued by the Meteorological Council.

The lowest isothermal on the map is 30° in the Arctic Regions. The isothermals here, to the north of the British Islands, are taken from Professor Mohn's great work on The Meteorology of the Norwegian North Atlantic Expedition, 1876–78 (Plate XVI.). These mean annual temperatures of the Norwegian Sea and Arctic Ocean, so carefully prepared by Mohn, are of first importance in their bearings on ocean circulation, and the same remark may be extended to the deep-sea temperatures of the same expedition.

Thus, the most powerful causes concerned in deflecting the isothermals of temperature of sea-water and the lines of specific gravity from their normal east and west directions are the prevailing winds and the surface currents of the ocean they originate and maintain; and further, as regards the specific gravities, the rainfall of the different regions powerfully influences the direction of the lines, and, as will appear further on, the vertical and horizontal movements in the ocean to which they give rise.

Temperature of the Ocean at Different Depths.

The Atlantic and Pacific Oceans.

Depth of 100 *Fathoms* (Map 3[1]).—On this map the isothermals are drawn for every five degrees of temperature, except in the cases of the highest and lowest temperatures of the oceans respectively, which are given to the nearest degree. From all the observations the mean temperature at this depth is 60°·7, and on the map, as on all the others, isothermals above the mean temperature at the particular depth are coloured red, and below it are coloured blue.

Looking first at the distribution of the temperature from about lat. 30° N. to lat. 30° S., it is at once seen that the higher temperatures lie to the westwards of the anticyclonic regions of the different oceans, and that the temperature of the western portions of these oceans is very much higher than in the eastern portions. The great difference observed is occasioned by the ocean currents setting in to the west, which are originated and maintained by the north-east and south-east trade winds. These winds drive the warm surface waters before them onwards towards the eastern coasts of the continents. In those cases where the higher temperatures do not quite reach the continents, it is owing to the interposition of islands in their paths; as, for example, Madagascar, the West Indies, and the East Indies, as respectively affecting Africa, North America, and Asia.

The North and South Atlantic present a strong contrast to each other. It will be seen that on the whole the surface specific gravities of the two oceans (Map 1) do not very materially differ from each other, but their temperatures at the 100 fathom depth are widely different. In the South Atlantic the area showing a temperature above 60°·7, the mean temperature of the oceans, is small as compared with the extent of the same temperature and upwards in the North Atlantic. Further, in the South Atlantic the highest isothermal is only 63°, whereas in the North Atlantic there is a large area with a temperature exceeding 65°, which encloses two small areas each with a temperature rising to 70°.

[1] A large number of maps were constructed for depths intermediate to those discussed in this Report, particularly for depths down to 200 fathoms, in connection with the question as to the depth to which the influence of season is experienced.

It has been long recognised that in the Atlantic the region of calms between the north and south trades is in all seasons north of the equator, reaching its northern limit, lat. 13° N., in July, and its southern limit, lat. 2° N., in January. Hence, in all seasons the south-east trades penetrate into the northern hemisphere, driving before them the warm surface waters of the South Atlantic. Thus vast quantities of the heated surface water of the South Atlantic are transferred bodily to the North Atlantic, resulting in these oceans presenting, as regards their temperature, the strongest contrasts to each other at all depths down to the bottom of the sea. The mean annual position of this region of calms may be shown by drawing on Map 51 of the Report on Atmospheric Circulation a line across the Atlantic, marking out the path of least barometric pressure of that region. Now it is this simple circumstance, the position of this line, which gives to the North and the South Atlantic Oceans their distinct contrasted features.

Turning now to the Pacific Ocean on the same map, we find that the line of least barometric pressure lies not north, but south, of the equator, from long. 160° E. to long. 130° W. An examination of the maps for the separate months shows that for eight months of the year this state of things substantially holds good, culminating in December, January, and February when barometric pressure is very low in Australia. In these months the north-east trades and ocean currents of the Western Pacific extend into the South Pacific to about lat. 15° S., as shown by the current charts now in course of preparation by the Meteorological Council.

The isothermals for the depth of 100 fathoms (Map 3) show that the manner of the distribution of the temperature in the North and South Pacific is precisely the reverse of what obtains in the Atlantic. In the North Pacific the highest temperature, 70°, is restricted to two very small areas, whereas in the South Pacific the area marked out by the isothermal of 70° covers a very extensive region, and encloses another region, also very extensive, where the temperature exceeds 72°. In truth at this depth the South Pacific presents a region with a temperature above the general mean of the ocean, larger than the high temperature regions of all the other oceans combined. The *rôle* played by Australia, the low atmospheric pressure of its warmer months mainly bringing about the result, deserves careful consideration.

A feature of the temperature in all the oceans is a pronounced increase in the eastern equatorial region of each ocean on nearing the continents. Thus in the Pacific about the Galapagos Islands, temperature is 62°, or 12° higher than in the same latitudes some distance to westward; in the Atlantic it rises to 59° in the Gulf of Guinea, or 6° warmer than it is to westward; and in the Indian Ocean it rises to 60°, or 4° higher than it is to westward. This peculiarity arises from two causes, one being the monsoonal deflection of the trade winds, for some distance out to sea, out of their course to westward, so as to blow towards and in upon the heated land of the continents; and this

cause operates strongest during those months when, as in the case of Australia, atmospheric pressure is lower in the interior than on the coast. Those winds, of course, blow the warm waters toward the coast. The other cause is the back water, or counter equatorial current to the east, which sets in particularly in the eastern division of the region of calms between the north and south trades.

In the Pacific, in equatorial regions, a great breadth of that ocean from Galapagos Islands to long. 165° E. has a temperature under the mean, falling to 50° in the middle region from long. 122° to 148° W. This low temperature of 50°, taken in connection with the isothermal of 72°, only eighteen degrees of latitude to the south, presents what may be regarded as perhaps the most striking fact of oceanic circulation. In August 1875 the Challenger took several soundings in this part of the ocean, and in Number 6 of the Preliminary Reports there is represented on Plate IV. the vertical distribution of temperature in this region as contrasted with surrounding regions. The following extracts from the Challenger soundings, Nos. 410 and 417, taken respectively on August 30 and September 14, 1875, will show the extraordinary differences in the rates of change of temperature with depth in these two parts of the ocean down to 200 fathoms :—

Depth in Fathoms.	No. 410. Lat. 7° 35′ N. Long. 149° 49′ W.	No. 417 Lat. 11° 20′ S. Long. 150° 30′ W.	Difference.
Surface.	81°·0	80°·0	+ 1°·0
10	79°·3	79°·9	− 0°·6
20	79°·3	79°·8	− 0°·5
30	79°·3	79°·6	− 0°·3
45	78°·2	79°·4	− 1°·2
50	74°·0	79°·0	− 5°·0
60	63°·4	78°·0	− 14°·6
70	56°·2	76°·7	− 20°·5
80	52°·6	75°·3	− 22°·7
90	51°·0	73°·7	− 22°·7
100	50°·3	72°·0	− 21°·7
110	50°·0	70°·1	− 20°·1
120	49°·8	68°·3	− 18°·5
130	49°·6	66°·2	− 16°·6
140	49°·4	64°·0	− 14°·6
150	49°·2	61°·4	− 12°·2
160	49°·0	58°·9	− 9°·9
170	48°·8	56°·4	− 7°·6
180	48°·6	54°·2	− 5°·6
190	48°·4	52°·4	− 4°·0
200	48°·2	50°·8	− 2°·6

These two examples may be regarded as typical of the distribution of the temperature over the greater portion of the intertropical part of the Pacific from the surface, where the differences are small, downwards to 100 fathoms depth, where the difference exceeds 20°. It is further seen that the difference nearly ceases at about 200 fathoms. Similar areas of low temperature are seen in the Atlantic to the west of Lower Guinea, and again in the Indian Ocean to the south of Ceylon. From their evident relations to the systems of atmospheric circulation, temperatures, and specific gravities of their respective oceans, a similar origin is suggested for them all.

These areas of low temperature occur to the north of the equator in the Pacific and Indian Oceans, but to the south of it in the Atlantic. Now these are the sides of the equator where are located at this depth areas of high temperature of less extent and intensity and of lower specific gravity than are found on the other side. In other words, they occur on the side of the equator where the warm waters of the surface, owing to the diminished specific gravity, are not diffused or conveyed so quickly downwards to greater depths.

Again, looking at the Pacific, the expanse of low temperature is bounded on each side by the trade winds, particularly by those tracks of the ocean where they are strongest. These trades impel to the westward warm surface currents, which by friction extend to a considerable depth in the ocean. To the eastwards these currents are fed by the current succeeding them generated by the trades, but on their equator side and the intervening space, the current, depth for depth, is more sluggish, because the surface winds there are either very light or wholly wanting. The result is that the currents of the trades proper take the largest source of their supply from the sea directly underlying the calm intervening region between the north and south trades. Hence there necessarily sets in an upwelling from lower depths to make good the drain, and the waters thus drawn from greater depths brings the low temperature of these depths up with them.

If this were all, these areas of low temperature would be found close up to the respective continents on the east side of the ocean. Now in no instance are they found in such a situation, but instead, some distance to westward in the ocean, apparently proportional to the breadth of the ocean, and having between them and the continent to the east a subsidiary area of high temperature. These small areas of high temperature have their explanation in the back water surface currents flowing eastward between the trades inforced by the westerly winds of a monsoonal character which are encountered for some distance out at sea before arriving at the western shores of the continents.

It is probable that the greater volume of, and distance traversed by, these currents in the broad Pacific as compared with other oceans directly result in a stronger and more widespread upwelling, accompanied with a correspondingly extensive diminution of temperature. Again, the South Atlantic pours vast volumes of its warm surface waters into the North Atlantic to join the westerly current already formed and flowing there, and this

united ocean stream drifts westwards past the West Indian Islands and thereafter joins the great Atlantic north-easterly current. In these circumstances, the source of supply to meet the drain caused by these west-going currents cannot be found in the North Atlantic off the coast of Africa, that part of the ocean being filled with a strong flowing current which is generated and maintained by the northerly and north-easterly winds prevailing there, but is to be sought for in the South Atlantic near the place where the northern section of the south-east trades are weakest. And there it is located with the upwelling and characteristic low temperature of 53° which accompanies it. It may be pointed out that, while the temperature of the Gulf of Guinea is greater than it is over the ocean to westward enclosed by the isothermal of 55°, it is to the east of the area of lowest temperature, 53°, that the highest temperature of 59° is found on the Guinea coast.

The lowest temperatures yet observed at the depth of 100 fathoms are 29°·0 by the Challenger in lat. 65° 42′ S. and long. 79° 49′ E; 29°·2 by the Dundee whaling vessels off Graham's Land; 29°·7 by the Norwegian Expedition in lat. 75° 16′ N. and long. 0° 54′ W.; and 29°·8 by Admiral Makaroff off Okhotsk—all, it will be observed, closely approximate to each other.

Specific Gravities at depth of 100 *Fathoms.*—In the Pacific Ocean, between lat. 40° N. and 40° S. and long. 150° E. to 130° W., the following are the results of the specific gravities :—

	North Pacific.	South Pacific.
Number of Observations,	23	22
Highest,	1·0260	1·0271
Lowest,	1·0253	1·0260
Mean,	1·0256	1·0264

thus showing a marked difference in the specific gravities of the ocean at this depth. Over the region of highest temperature, which is south of the equator, the specific gravities are all high, but over the North Pacific they are low. They are low also in the region of lowest temperature, 50°, being only 1·0257. It may be added that the same low specific gravity occurs in lat. 15° S. and long. 94° W., where, in respect of the south-east trades, upwelling is to be expected, but to the west of this point, where high temperatures rule, it rises to 1·0269. Hence the high specific gravities of the South Pacific convey down to this depth a temperature much greater than is done in the North Pacific, where the specific gravity is much less.

In the North Atlantic, from lat. 12° to 40° N. the mean of the fifteen specific gravities observed over the whole breadth of the ocean is 1·0270, the lowest being 1·0264 and the highest 1·0278. This part of the ocean is therefore remarkable for its high specific gravity, higher, indeed, than any other part of the ocean from which we have observations. In the South Atlantic, from Cape St. Roque to Monte Video to long. 30° W. on the east, there are eight observations, giving a mean specific gravity of 1·0268, which

also is high. In the same ocean, between lat. 10° to 40° S., and a little to the west of long. 10° W., the Challenger took eight observations, with a mean of 1·0264, which is still a high mean, but less than the mean of 1·0268 found to westward as we near South America. But within or close to the region where temperature falls to 53° the five specific gravities observed by the Challenger were 1·0261, 1·0262, 1·0260, 1·0260, and 1·0261, giving a mean of 1·0261, thus corroborating the view that the low temperature of 53° found here is brought, by upwelling, from greater depths.

Depth of 200 *Fathoms* (Map 4).—The mean temperature of the ocean at this depth is 50°·1, showing thus a fall of 10°·6 from the mean at 100 fathoms. The part of the North Atlantic where temperature is above the mean, 50°·1, embraces now a very much wider area than that of the South Atlantic; further, within the same area the temperature rises much higher in the North than in the South Atlantic, the highest isothermal in the former being 64° whereas in the latter it is only 55°. In the North Atlantic the mean specific gravity is 1·0270 over the warm area, but over the similar area in the South Atlantic it is only 1·0261. Thus in the North Atlantic the specific gravity conditions favour a more rapid descent of the warmer surface water, which, as shown by the temperature observations, is what actually occurs.

In the South Pacific the warm regions embrace a much wider area than in the North Pacific, the temperature at 200 fathoms being still higher in that half of the ocean which receives the overflow of warm surface waters from the other half, precisely as obtains between the two divisions of the Atlantic. In the South Pacific the mean specific gravity is 1·0259, and of the North Pacific 1·0256, these, it is to be noted, being both very much less than the mean specific gravity of the North Atlantic, which is 1·0270.

In both the Atlantic and Pacific a local higher temperature is still found in the eastern equatorial regions of both oceans, but the increase from the lower temperature to the westward is now much less than it was at 100 fathoms, being only from 2° to 3° instead of 12° and 6°. With these reduced differences the specific gravity differences are also reduced.

Depth of 300 *Fathoms* (Map 5).—The mean temperature of the ocean at 300 fathoms is 44°·7, or 5°·4 less than at 200 fathoms. The higher temperature of the North as compared with the South Atlantic is even more pronounced than at less depths, as seen from a comparison of the regions of the two oceans included within the isothermal of 45°. Further, while the highest isothermal in the South Atlantic is 48°, covering a very small area, the same isothermal in the North Atlantic covers about half the area of the whole ocean, and includes two areas within which the temperature rises to fully 60°; in the western of the two it rises to 63°, or 15° higher than the highest temperature anywhere found in the South Atlantic. It is also to be noted that these two areas of warm water are both well to the west of the ocean, in other words, they

are in the lines of the drift of the surface currents. The highest isothermal in any other ocean is 53°, or 10° lower than that of the North Atlantic, thus emphatically distinguishing this ocean as, in this respect, markedly different from all other oceans.

The ten observed specific gravities in the Atlantic from lat. 13° to 40° N. give a mean of 1·0266, only one occurring as low as 1·0262 near Cape Verde Islands. In marked contrast with this, the mean of the fifteen specific gravities observed between lat. 10° and 40° S. is 1·0258, only one of which exceeded the minimum of the North Atlantic. Thus, we have still in the North Atlantic the specific gravities greatly more favourable to the descent of the warm water of the higher strata, and the observations of temperature amply show that this descent takes place.

A very different state of things now holds good in the Pacific Ocean, which in its western division has temperatures above the mean uninterruptedly through eighty degrees of latitude, and in its eastern division through forty degrees. As in the case of the Atlantic, the higher temperatures are in the western part of the ocean or in the lines of the warm surface currents. A lower temperature still prevails in mid-ocean immediately south of the equator, and from the western projection of this low temperature area to the south there is a somewhat rapid increase of temperature amounting at this depth to 5°. The two regions of highest temperature are 51° about ten degrees of latitude south of Japan, and 50° the same distance north of New Zealand.

The specific gravities, while still a little higher in the South than in the North Pacific, now approximate to each other over the whole extent of the ocean from lat. 30° N. to 40° S., the mean being 1·0256, very much below the specific gravity of the North Atlantic.

Depth of 400 *Fathoms* (Map 6).—The mean temperature of the ocean at 400 fathoms is 41°·8, or 2°·9 less than at 300 fathoms. The excess of temperature in the North Atlantic is even more pronounced than at the previous depth. In the South Atlantic the highest temperature is 42°·5, or only 0°·7 above the mean temperature of the whole ocean, but in the North Atlantic nearly the whole extent of it has a higher temperature than this, and the maximum temperature rises to 55°, or 12°·5 higher than in the South Atlantic. It is also to be noted that the higher temperatures still occupy the western division of the ocean.

The specific gravities of the two oceans are very different. In the North Atlantic the mean is 1·0264, but in the South Atlantic it is 1·0258, and in the Gulf of Guinea 1·0254. The densities thus favour the descent of the warmer water of the upper layers to greater depths in the North than in the South Atlantic.

In the North Pacific the highest isothermal is 43°, but in the South Pacific this isothermal covers a much wider extent, and temperature rises within the warm area to 47°, or 4° higher than in the North. In this part of the ocean the mean specific gravity is 1·0259, but elsewhere in the North and South Pacific it is only 1·0255.

There is still seen an increase, though it is now a small one, in the temperature of the Atlantic and Pacific in the extreme east of the equatorial region near the continents.

Depth of 500 *Fathoms* (Map 7).—Very marked changes have now been brought about in the distribution of temperature over the Atlantic. The mean temperature of the ocean has now fallen to 40°·1 or 1°·7 lower than at 400 fathoms, and the whole of the water of the South Atlantic is now under the average temperature of the whole ocean, except a narrow tongue which projects southward about long. 10° W. nearly as far as lat. 10° S., where a temperature of 40°·3 is found.

On the other hand, nearly the whole of the North Atlantic to the north of the line of lowest atmospheric pressure, marking the region of calms, is above the average, and the region of highest temperature is no longer located in the western division of the ocean in the line of the drift of the trades. But the highest temperature, 54°, is now to be found immediately to the west of Gibraltar, thus pointing to a new distinct source of the high temperature of the North Atlantic from 500 fathoms downwards.

The specific gravities of the North Atlantic are still much higher than any elsewhere observed, but at this depth there are no observations near Gibraltar. Those observed at greater depths will afterwards be referred to in connection with this appearance of high temperature in the east of the ocean.

No area indicating a region of higher temperature is now seen in the North Pacific, but in the South Pacific there is such a well-marked area between New Zealand and Australia, showing an isothermal of 44°, being thus 4° higher than the highest in the South Atlantic, but 10° lower than the highest in the North Atlantic. Observations of specific gravities at this depth are almost entirely wanting in the Pacific.

Depth of 600 *Fathoms* (Map 8).—The outstanding feature of the temperature at this depth is presented by the North Atlantic, where the higher temperatures no longer appear in the western part of the ocean. The highest isothermal seen anywhere, 51°, is to the west of Gibraltar, from which temperature gradually falls to 39° immediately off the coast of America. Between the Canaries and the Azores the specific gravity of 1·0267 has been observed, and a little to westward 1·0263. These are very high specific gravities for this depth, being much higher than any elsewhere observed in the ocean, and they point unmistakably to the warm dense undercurrent which issues from the Mediterranean as the source of the remarkably high temperature now overspreading the Atlantic. Further, the disposition of the isothermals alone would place the matter beyond dispute. The all but total absence of temperatures above the average from the South Atlantic is a noteworthy feature of this ocean, for only on its northern side does the temperature rise 0°·7 above the mean. This striking feature of the temperature of the South Atlantic, seen also at the depths immediately above and below the 600 fathoms depth, may be referred to two causes, the one being the transference to the

north of the equator of the high specific gravities of its upper layers, so that descent of the higher temperature is greatly retarded. The other cause is the greater depth to which these currents extend that have their origin in the trade winds of the South Atlantic, which, of all trade winds, are the strongest and most continuous.

The mean of twelve observations of specific gravity in the Gulf of Guinea is 1·0256, being thus markedly lower than the specific gravity observed to the west of the Canaries.

In the Pacific the highest temperatures are round the Galapagos Islands and to the north of New Zealand, where the temperature rises to 41°, being thus 10° lower than the highest in the North Atlantic. These positions accord with those of the highest temperature at less depth.

There is seen, just as at the 500 fathoms depth (Map 7), a local region of slightly lower temperature to the east of Australia between lat. 10° to 22° S. and long. 145° E. to 178° W. A better knowledge of the contours of the bed of the ocean and some knowledge of the distribution of specific gravities may be looked forward to as the explanation of this temperature.

Depth of 700 *Fathoms* (Map 9).—The mean temperature of the ocean at this depth is 38°·1, or 0°·9 lower than at 600 fathoms. The high temperature from the Straits of Gibraltar oceanwards is still the striking feature of the temperature. Though a comparatively high temperature still extends westwards to America, yet the high temperatures marking it out from the other oceans may be regarded as now restricted to the eastern half of the North Atlantic. The high specific gravity of 1·0268 has been recorded to the east of the Azores, whereas in the Gulf of Guinea, of the ten specific gravities observed by Mr Buchanan, the highest was 1·0260 and the mean of the whole 1·0255,—the high specific gravity of 1·0268 near the Azores thus still pointing to the denser warmer waters of the Mediterranean as their source. The relative distribution of the temperature in the South Atlantic and the Pacific remain substantially the same, and as regards the South Pacific even to a comparatively low temperature to the north-east of Australia.

It may be remarked that on nearing the Pacific coast of America in equatorial regions the temperature rises one degree, and in the Gulf of Guinea near the coast there is an increase of half a degree.

Depth of 800 *Fathoms* (Map 10).—The mean temperature of the ocean is 37°·3, or 0°·8 lower than at 700 fathoms. To the west of Gibraltar temperature has now fallen from 51° at 700 fathoms to 46°, but this region is still the source of an abnormally high temperature diffused westwards over the Atlantic, the great excess apparently not passing to the west of long. 30° W. At this depth a large number of specific gravities have been observed, chiefly by the Challenger. In the area of highest temperatures, 1·0268 and 1·0264 have been observed. In the Atlantic, from lat. 6° N. to 40° S., the mean of thirteen observed specific gravities is 1·0258, and in the Gulf of

Guinea five observations give a mean specific gravity of 1·0245. It is scarcely necessary to remark that these still point to the influence of the Mediterranean.

The temperature relations of the South Atlantic and the Pacific are unchanged. In the North Pacific ten observations give a mean specific gravity of 1·0255, and in the South Pacific fifteen observations also give a mean of 1·0255, which very well accords with the equable distribution of temperature over this ocean. The region of the low temperature to the north-east of Australia is only half a degree lower than surrounding temperatures.

Depth of 900 *Fathoms* (Map 11).—The mean temperature at this depth is 36°·8, having fallen half a degree from 800 fathoms. The highest temperature, 42°, is still to westward of Gibraltar, from which the temperature steadily falls westwards in the same manner as at the depths of 500, 600, 700, and 800 fathoms, but only to the extent of 2°. In the South Atlantic temperatures are relatively higher, and in the Pacific there is a tendency towards an equalised temperature more than in any of the other oceans. The high specific gravities of 1·0269 and 1·0264 were observed to the west and south-west of Gibraltar, which are not approached anywhere else, the highest of the thirteen observed between lat. 10° N. and 10° S. being 1·0259 and the mean 1·0256. It may be added that a specific gravity of 1·0271 has been recorded to the north-east of the Galapagos Islands in the region of the highest temperature of the Pacific at this depth.

Depth of 1000 *Fathoms* (Map 12).—From 900 to 1000 fathoms the mean temperature has only dropped 0°·3, being now 36°·5. The distribution of temperatures and specific gravities continues much the same over the oceans, the North Atlantic, looked at as a whole, showing the highest temperature, then follow in order the South Atlantic, the South Pacific, and finally the North Pacific.

There is still a trace seen of the influence of the Mediterranean. With respect to the high temperatures, so marked a feature of this part of the ocean from 500 to 1000 fathoms, it is to be remarked that they are not part and parcel of any great surface oceanic current, but simply an illustration of a slow vast movement of the waters of the ocean wholly due to differences of specific gravity of these waters.

Depth of 1500 *Fathoms* (Map 13).—From 1000 to 1500 fathoms temperature has fallen 1°·2, the mean being 35°·3. The highest temperatures are :—In the North Atlantic, 38° ; South Atlantic, 37°·5 ; North Pacific, 36°·5; and South Pacific, 36° ; there being now only 2° between the highest and lowest of these. A noticeable feature is that the North and South Atlantic have now nearly the same temperature. The western half of the Atlantic, from lat. 10° N. southwards, has a temperature decidedly lower than the eastern half.

But while the mean fall of the temperature of the whole ocean is only 1°·2, it is larger in the Atlantic. Thus averaging all the observations, the means of the North

Atlantic between latitudes 40° and 30° at depths of 1000 and 1500 fathoms are 39°·1 and 37°·4; and between the same two latitudes of the South Atlantic they are 37°·1 and 37°·0. Hence the temperature in the North Atlantic falls 1°·7, whereas in the South Atlantic the fall is only 0°·1. The following gives the results for both oceans from the equator to lat. 40° :—

	North Atlantic.	South Atlantic.
Mean Temperature at depth of 1000 fathoms, ...	39°·0	37°·8
Mean Temperature at depth of 1500 fathoms, ...	37°·3	37°·1
Differences,	1°·7	0°·7

The relatively slow rate of decrease of temperature of the South Atlantic may be regarded as commencing about 800 fathoms, to be clearly marked at 1000 fathoms, from which depth downwards it gradually approximates through 1100, 1200, 1300, and 1400 fathoms to what is shown at 1500 fathoms on Map 14. The specific gravities at the bottom of the ocean (Map 16) afford a ready explanation of this remarkable distribution of temperature. Owing to the higher specific gravities of the North Atlantic, an extensive deep-sea current from the North to the South Atlantic, carrying a higher temperature with it, sets in at depths at which the influence of the surface currents is no longer felt, and becomes more pronounced as the depth below 1000 fathoms is increased. Hence the North Atlantic receives large accessions to its salinity from the South Atlantic through the surface currents, which the deep-sea currents again return to the South Atlantic. It will be seen from Map 16 that this source of movement, viz., differences of specific gravities, is virtually absent from the deep waters of the Pacific.

The Gulf of Mexico.

This sea exhibits several peculiarities as regards temperature and specific gravity which have important bearings on oceanic circulation. The surface temperature of the southern half is above 80° and the northern half under it. The specific gravity in the south-eastern portion is 1·0271, rising in November to a mean of 1·0283, falling in the north of the Gulf to 1·0266. The high temperature and the specific gravity of the Gulf of Mexico is due to the circumstance that the strong current entering it from the east has had, during its passage across the Atlantic, its surface long exposed to a blazing sun and a dry, clear atmosphere. As there is no passage to westward for the current, the surface waters are further delayed in the Gulf till they escape into the Atlantic, chiefly through the Straits of Bemini.

At the 100 fathoms depth the temperature conditions have materially altered. As regards the entrance to the Gulf, it is within the North Atlantic isothermal of 65°, but over the Gulf itself temperature, to the west of long. 90° W., falls below 60°, and over a small region between that line and the continent it falls to 55°. Here, then, observation gives no evidence that the dense surface waters descend to any great depth carrying with them their high temperature downward. The evidence, on the contrary, goes to show that the strong surface current issuing through the Straits of Bemini, with the deeper current it generates, drains away, to a very large extent, the whole of the warm dense waters of the surface, thus bringing about an upwelling of colder water in the western part of the Gulf, so that the temperature there is 15° lower than it is immediately to the south-west of Cuba. Unfortunately, no specific gravities have been available at this and lower depths in the Gulf of Mexico, which would probably show a diminished specific gravity corresponding to the diminished temperature. Three specific gravities have, however, been observed in the western part of the Atlantic, viz., 1·0278, 1·0278 and 1·0274, which may be regarded as pointing to a mixing of the higher surface specific gravities of the Gulf of Mexico with the water of the Atlantic at this depth.

The relation of the temperature of the west of the Gulf of Mexico to that of the Atlantic continues to hold at greater depths till the temperature falls at 700 fathoms to 39°·5, at which depth the Gulf of Mexico becomes "a closed sea," and the temperature remains at this point down to the greatest depth, 2067 fathoms, of the Gulf of Mexico. The following gives a comparison of the lowest temperature in the Gulf of Mexico and the temperature at the entrance to the Gulf at the different depths :—

Depth in Fathoms.	Temperature at Entrance.	Lowest Temperature in Gulf.	Difference.
200	55°·0	46°·0	9°·0
300	50°·0	44°·0	6°·0
400	43°·5	41°·0	2°·5
500	41°·5	40°·0	1°·5
600	41°·0	40°·0	1°·0
700	40°·0	39°·5	0°·5

These facts point to a strong upwelling of the deep waters in the western division of the Gulf of Mexico, necessitated by the strong current which issues from it, and which extends to a considerable depth in the ocean. This view is borne out by the fact that the Atlantic easterly current is there embayed before starting to join the Atlantic north-eastern current on its way towards the Arctic Ocean, and southerly and south-westerly winds become prevalent, thus inducing upwelling in the western part of the Gulf.

It has been calculated that, owing to the heaping up of the waters driven by the

trade winds into the Gulf of Mexico, its level is thereby raised fully three feet above the general level of the ocean. The following peculiarities distinguish this remarkable current: at its starting place in the Gulf of Mexico its waters have a higher specific gravity than those of any other ocean current at its starting; it starts with a three-feet head of water; and along its whole course, from the Straits of Florida to the Arctic Ocean, the prevailing winds at all seasons are substantially south-westerly or in the same line of movement. Hence the volume and speed of this great ocean current as it issues from the tropical region, and the enormous influence it has on the western climates of Eurasia.

The Mediterranean Sea.

The mean annual surface isothermal of 65° from the Atlantic passes eastwards through the Strait of Gibraltar, curves round by the north of Sardinia, and round by the Strait of Messina to Cephalonia; and the isothermal of 70° passes from Libya in a north-easterly direction to Tarsus; and the isothermal of 60° just appears in the extreme north of the Gulf of Lyons.

To the west of the Strait of Gibraltar the specific gravity of the surface is a little higher than 1·0270, but it quickly increases in advancing eastwards till, about long. 10° E., it rises to 1·0280, and over the eastern basin of the sea it is 1·0290, showing thus a specific gravity higher than ever occurs in the open sea. Hence the water of the Mediterranean, even on the surface, is much salter than that of the Atlantic. This is due to the dry climate of the region, so that the loss from evaporation is not nearly compensated for by the fresh-water additions from the rainfall and by the rivers which empty themselves into its basin.

The observations and discussions of Dr Carpenter on this sea and the Atlantic adjoining in 1870–71 must be regarded as a classical contribution to the question of oceanic circulation. The results of these and other observations and discussions established the important fact that in the Strait of Gibraltar there are, after allowing for tidal influence, two currents, one superimposed on the other. The upper current is an inflowing one carrying with it the surface water of the Atlantic, and the undercurrent is an outflowing one, carrying out with it into the Atlantic the warmer and denser underlying water of the Mediterranean.

The submarine ridge at the Strait separating the deep water of the Atlantic from that of the Mediterranean is not quite 200 fathoms from the surface, and hence the direct communication between the seas is confined within that depth. A little way to the east of the Strait the temperature of the Mediterranean at 100 fathoms is about 55°; it increases eastward to 58° to the east of Malta, and rises a little above 60° in the Levant. The specific gravities to the east of the Strait are about 1·0284, whereas in the Atlantic to the west specific gravity is but 1·0267. Hence the outflowing undercurrent

throws into the Atlantic a body of water much salter, and therefore, even after allowing for temperature, much denser, than the water of that ocean.

At 200 fathoms to the east of the Strait the temperature is 55°, from which, on proceeding eastwards, it gradually rises to 57° about long. 20° E. and to 58° in the Levant. To the east of the Strait the specific gravity is now 1·0287, while a little to the west in the Atlantic it is 1·0268 ; in the Levant the specific gravity is 1·0290. At 300 fathoms, and down to the bottom of the sea, the temperature of the western basin is 55°·5 and of the eastern basin 56°·5 ; the mean specific gravity is 1·0290, calculated from the numerous observations made in the eastern basin by the "Pola" Expeditions in 1890–92. From the few deep-sea observations made of specific gravities in the western basin, it is probable that the mean there is about 1·0286. The greatest depth observed by the "Pola" was 4400 metres, or 2406 fathoms, in lat. 35° 45′ N. and long. 21° 46′ E., the temperature at that depth being 56°·3 and the specific gravity 1·0295. The above temperature is fully 20° higher than in the open ocean at that depth, and is closely approximate to the temperature of the Atlantic adjoining the Strait of Gibraltar at the depth of the ridge separating the two seas, or nearly 200 fathoms.

Owing to the great specific gravity of this warm undercurrent from the Mediterranean, it gradually sinks on entering the Atlantic, but its effect in heating the waters of this ocean over any considerable extent only becomes clearly apparent at the depth of 500 fathoms. Beyond this depth, its great influence is felt over nearly the whole breadth of the Atlantic to at least about 1000 fathoms. Periodical surveys of the Mediterranean would serve many important objects ; thus, if made every five years, it would soon be shown whether the outflow of the Gibraltar undercurrent of such high specific gravity is attended with any diminution of the salinity of this sea. It is therefore not winds and currents, but different specific gravities and different levels, which rule the interchanges of the waters of this sea.

The Red Sea.

The mean annual temperature of the surface waters near the head of the sea is 77° ; it rises to 80° about lat. 22° N., to 84° in lat. 16° N., and then drops down to 82° at the Straits. The isothermal of 80° is in long. 50° E.

At the Strait of Bab-el-Mandeb the specific gravity is 1·0275, which quickly increases on advancing northward to 1·0280, 1·0285, 1·0290, 1·0295, 1·0300, 1·0305, and near Suez to 1·031. These specific gravities are caused by the rapid evaporation which takes place on account of the great heat, dryness, and rainless character of the climate of this arm of the sea.

At 100 fathoms the temperature near the north end of the sea is 65°, from which

it gradually rises on proceeding southward to 75° near the Strait, outside which it quickly falls to 70° and 65° about long. 53° E. At this depth, in lat. 22° N., the specific gravity is 1·0302, immediately outside the Strait 1·0282, and off Socotra 1·0264. At 200 fathoms, and at greater depths, 200 fathoms being about the depth of the submarine ridge separating this sea from the ocean, the temperature is 71°. The specific gravity in lat. 22° N. is 1·0303, off Aden 1·0267, and near Socotra 1·0264, being thus nearly the same as the specific gravities at 100 fathoms. At 300 fathoms the specific gravity is 1·0303, and it is probable that this degree of salinity obtains down to the bottom of the sea.

An undercurrent of warm water of great saltness issues from the Red Sea, just as happens in the case of the Mediterranean, and, as will appear, it has a marked influence on the temperature and specific gravity of the north-western part of the Indian Ocean.

The Persian Gulf.

The mean annual surface temperature at the head of the Gulf is 80°; it rises to 82° a little to the west of Ormuz, and outside the Gulf falls to 80° in long. 60° E. In this last situation the specific gravity is 1·0271, but in the Gulf itself no specific gravities have been observed. Its influence, therefore, on the temperature of the Arabian Sea adjoining will be similar, though less in degree, to that of the Red Sea.

The Indian Ocean.

This ocean differs essentially from the other great oceans in being completely land-locked on its north side, in comparatively low latitudes, thus putting it, as a whole, more fully under the influence of the Southern Ocean, as will be seen as the lower depths are dealt with.

The most noticeable feature of the mean annual temperature of the surface is that the isothermals are more regularly distributed over the Indian Ocean than over any of the other oceans. From about lat. 13° S. to the north of the ocean the temperature exceeds 80°, except the north-west portion of the Arabian Sea, as shown on the map (Map 2). Over this tract temperature is lowered by the upwelling produced by the prevailing N.W. winds of that region, which consequently blow from the land seaward, driving the warm surface current before them, the place of the surface water being taken by the colder water rising from lower depths. This lowering is continued along the east coast of Africa to some distance south of Cape Guardafui. To the south of lat. 13° S. temperature falls with characteristic regularity as the latitude increases,

except that it is rather lower over the eastern parts off the coast of Australia than over the western parts off the coast of South Africa.

The specific gravities of the Arabian Sea and of the Bay of Bengal are strikingly different. Owing to the very salt currents from the Red Sea and Persian Gulf, and to the extreme dryness of the climate, the specific gravity of the Arabian Sea is large. On the other hand, owing to the heavy rainfall during the summer monsoon, and to the northerly winds during the winter months inducing upwelling, the specific gravity of the Bay of Bengal is low. For the same reasons the east coasts of Asia and the Eastern Archipelago are marked by a specific gravity much lower than anywhere else over the ocean in the same latitudes. The track of least specific gravity in the central part of this ocean is a little south of the equator from east to west.

At 100 fathoms a large extent of this ocean has a temperature above the mean (Map 3), this region being virtually defined by the isothermal of 60°. The highest temperature, 70°, is near the centre of the ocean, about long. 80° E. The same high temperature is found a little to the east of the Strait of Bab-el-Mandeb, from which point eastwards it gradually falls to 60°. The lowest temperature, 56°, overspreads a considerable area lying east and west to the south of Ceylon. This area lies in the region of the meeting of the N.E. and S.E. trades, and its position is analogous to the low-temperature regions of the Atlantic and Pacific at this depth with respect to the N.E. and S.E. trades of those oceans.

Unfortunately, at no depths north of lat. 40° S. are there any specific gravities available, except in the Arabian Sea and Bay of Bengal, and there only down to 400 fathoms. Outside the Strait of Bab-el-Mandeb the specific gravity is about 1·0280, but in the east of the Bay of Bengal it is 1·0259, or even lower, the temperatures being respectively 70° and 56°. The low specific gravities in the Bay of Bengal seriously prevent the diffusion downwards of the higher temperatures of the surface. In this region there is no doubt that upwelling takes place during the winter months when winds are northerly.

The distribution of temperature is totally changed at 200 fathoms, nearly the whole of the ocean north of lat. 40° S., being above 50°·1, the mean temperature of the oceans. The region of highest temperature, 61°, remains at the same place as at 100 fathoms, and the lowest temperature, 50°, is situated to the north-west of Australia, where also occurs at 100 fathoms a secondary minimum. The temperature is also high in the west of the Arabian Sea, and there the specific gravity is 1·0267 off Aden to the east of the Strait of Bab-el-Mandeb, gradually falling to 1·0261 near Ceylon.

At 300 fathoms the whole ocean is above the average temperature to the north of lat. 40° S., the absolute highest, 55°, being near Cape Guardafui. But the highest temperature in the ocean proper is 53°, the position of which is now fully ten degrees of longitude to the westwards of its position at 100 and 200 fathoms. This

temperature of 53° is now higher than any observed in the Pacific or South Atlantic, but is 10° lower than the highest in the North Atlantic near Bermuda. Again the lowest temperature, viz., 45°, is to the north of Australia, being only 0°·3 above the general mean.

At 400 fathoms the highest temperature continues to be found near Cape Guardafui, being, of course, due to the outflowing undercurrent from the Red Sea. The whole ocean is above the general mean, the lowest temperature being still to the north of Australia, but the highest, 50°, with the large extent of high temperature surrounding it, has now moved bodily a considerable distance to the south-west, so that the central position which, at 100 fathoms, was about lat. 18° S. and long. 90° E., is now in lat. 34° S. and long. 60° E.

From 500 to 800 fathoms substantially the same features characterise the temperature distribution of this ocean—a relatively high temperature in the Arabian Sea, another region of high temperature well to the south-west of the ocean, a region of lowest temperature between, extending from the north of Australia westwards, and a temperature much higher than is found in the Pacific or South Atlantic, but lower than the highest of the North Atlantic.

The high temperature of the Atlantic is mainly brought about by the large accessions of warm currents poured into it by the South Atlantic and the Mediterranean. But as regards the Indian Ocean, no such accessions from other oceans are received, with the exception of what is contributed by the Red Sea, and by a surface outflow from the Persian Gulf. Now these accessions cannot be regarded as influencing in any appreciable degree the region of high temperature near the centre of the ocean. This high temperature, as compared with the Pacific and South Atlantic, is in all probability due to the circumstance that for the heat generated on the surface in this intertropical region there is no escape to northward, but it is, on the contrary, all retained within the ocean itself.

At 900 and 1000 fathoms the Indian Ocean and South Atlantic have nearly the same temperature, both in this respect being intermediate between the North Atlantic on the one hand and the Pacific on the other.

At 1500 fathoms this is all reversed, the Indian Ocean being now the coldest ocean ; the larger portion is under the average, pointing out that, on account of the low surface specific gravity of this ocean taken as a whole, the higher temperature of the upper strata is not conveyed to such depths as occurs in the other oceans. Hence, at less depths, temperature is higher than would otherwise be the case. The highest temperature is in the north-west, about the region where, so far down as observations have been made, the specific gravity is great.

The Arctic Ocean (inclusive of the Norwegian Sea).

This ocean is bounded on the south by the Faroe Ridge, at a depth not exceeding 260 fathoms, extending from Iceland in a south-east direction to a point 45 miles south of Faroe. To this succeeds a deeper channel, the Wyville Thomson Ridge, 30 miles across, descending to 380 fathoms, on the east of which commences a shorter ridge, with a depth of 260 fathoms, connecting it with the mainland of Scotland. Since the shallowest part of the sea from Iceland to Greenland is less than 260 fathoms, it follows that this ocean is a "closed sea" at all depths greater than 260 fathoms, except for the short distance of 30 miles where the ridge sinks down to 380 fathoms.

Owing to the prevailing south-westerly winds and accompanying current, the isothermals of the surface of the sea from 60° to 45° are pushed to higher latitudes than anywhere else on the globe, and it is to be remarked that the isothermals of the surface water of the sea are, for the same positions, much higher than those for the air. The line of maximum temperature is not close to the coast, but lies out in the Atlantic a considerable way from the west coasts of Europe. The extension of the isothermal of 40° eastwards round the north of Norway, and of the isothermal of 30° northwards beyond Spitzbergen, are points of great interest in connection with the distribution of the isobars and prevailing winds of this region.

It is not only higher temperatures but also higher specific gravities that this great oceanic current conveys into high latitudes. Thus in the North Pacific the specific gravity of 1·0260 extends only to about lat. 33° N., and in the South Pacific, South Atlantic, and Indian Ocean it just passes lat. 40° S. in a few places. In the North Atlantic, however, it extends as far north as lat. 72° N. and the specific gravity of 1·0255 to lat. 78° N. This northern extension of the region of high temperature and specific gravity is doubtless occasioned by the complete absence of icebergs in the eastern division of this ocean. The important result is that the higher temperature of the surface descends to greater depths in this ocean than would otherwise be the case. The lowering of the specific gravities, by the rivers and rainfall, from the English Channel northwards along the west coast of Norway to Vardö is strongly marked.

It will be observed that at 100 fathoms there is an area to the south-west of Spitzbergen, extending as the depth increases, where the temperature is only 30°. This is the region where the prevailing winds, after curving round from the south-west to the north-east, sweep along the fields of Arctic ice, in relation to which the course of the isothermal of 35° is interesting. At this depth the highest temperature is close in shore to the eastward.

The specific gravities closely follow those of the surface. The mean of ten observations about lat. 73° N. and long. 0° to 40° E. is 1·0258, which is very greatly in excess of any specific gravity observed in any ocean in similar latitudes. These,

together with the extraordinarily high temperatures accompanying them, evidence the volume and depth of the powerful current from the Atlantic on which they depend.

At 200 fathoms this ocean is still in free contact with the Atlantic, and the higher temperatures are well inshore. The highest isothermal is 43° to the south of the Lofoten Isles, and it is remarkable that the isothermals of 35° and 30° are much in the same positions as at the 100 fathoms depth. The specific gravities are virtually identical with those at 100 fathoms, and at both depths they are highest midway between Norway and Spitzbergen.

Except the comparatively narrow channel of the Wyville Thomson Ridge, the whole of this ocean at 300 fathoms is cut off from the Atlantic and becomes a "closed sea," and as a consequence the temperature now assumes a wholly different mode of distribution. The isothermals, instead of having a S.W. and N.E. course on the lines of the great ocean current, indicate an area of higher temperature, with its axis approximately about lat. 70° N., extending nearly as far west as Jan Mayen, but between it and the Faroe Ridge there is a much lower temperature, 32°. Since in this cold area Mohn noted a specific gravity of 1·0262, the low temperature cannot be ascribed to upwelling, but its origin is rather to be referred to the north-west in the region marked out by the isothermal of 30°. The increase from 30° to 32° is derived from the upper denser waters, which, having passed the Faroe Ridge, have in their northerly course partially sunk to lower depths, and have consequently to some extent raised both the temperature and specific gravity.

The warmer area to the north-east, marked by the isothermals of 39°, 37° and 35°, is coincident with the region where the great south-westerly current comes to a stop and the north-easterly current begins its course. A head of water is no doubt formed in the region where these south-westerly winds and attendant currents cease. The additional pressure thereby produced, and the high specific gravities, result in a downward movement of the upper waters, and consequently the raising of the temperature over the region where it occurs. The increase of temperature from this strong downward movement is less and less as the depth increases, but it is distinctly traceable at least as far as 700 fathoms, and is still accompanied with the high specific gravities of the surface.

The positions of the isothermals from 300 to 700 fathoms make it plain that the movements of the ocean at these depths are strongly downwards rather than horizontal; that the influence of prevailing winds on the surface and deeper currents arising from them is no longer felt in any recognisable degree; and that all movements are virtually restricted to those caused by differences of temperature and salinity. The position retained by the region of higher temperature quite disproves the idea of the existence of any vorticose movement in these deep waters.

At 1000 fathoms and greater depths the temperature to the south-west of Spitz-

bergen falls to 29°. The deepest sounding made was 2005 fathoms in lat. 68° 21′ N. and long. 2° 5′ W., where the temperature observed was 29°·5. There are five positions, at depths exceeding 1500 fathoms, at which Mohn observed the temperature and specific gravity. They range from 1547 to 1861 fathoms, with a mean of 1688 fathoms; their mean position was lat. 69° 20′ N. and long. 3° 27′ E., and the mean temperature was 29°·8, and mean specific gravity 1·0259. This temperature found in the deepest parts of the Arctic Ocean is only from 2° to 3° higher than the freezing-point of sea-water of the above specific gravity. All the five positions underlie the region of the warm area, and it will be seen that the specific gravity there observed is closely approximate to that of the surface.

The area enclosed by the surface isothermal of 30° has virtually the same temperature down to the bottom, except that at the greater depths it falls to 29°, and the same area appears to have a lower specific gravity than the rest of this ocean, judging from the small number of observations of specific gravity taken. The important inference follows that the great volume of the warm dense current from the Atlantic does not contribute the water forming the north-easterly current that fills the cold area, but that it overspreads the region around where it terminates and thereafter descends downwards to greater depths, cooling as it descends till at about 1000 fathoms it becomes nearly as cold as the rest of the Arctic Ocean. The different specific gravities no doubt play an important part in delaying the mixture of these two great bodies of water placed side by side in the region enclosed between Norway, Iceland, Greenland, and Spitzbergen. The high specific gravities observed at the bottom doubtless play an important part in maintaining the fluidity of the bottom water of the Arctic Ocean.

The Southern Ocean.

Under this head all portions of the ocean to the south of lat. 40° S. are included. Everywhere in this extensive region the temperature of the surface falls below 60°. The lowest isothermal is 40°, which may be taken as the annual mean about lat. 55° S. all round the globe. To the south of lat. 55° S. no observations have been taken for any two or four months of the year, such as January and July, or February, May, August, and November, &c., from which a fairly good annual mean could be calculated. It is probable, however, that, reasoning from the positions of the isothermals of the air and the temperatures at 100 fathoms, an annual mean of about 30° encircles the globe near lat. 63° S. The specific gravity is under 1·0260 all round, falling to 1·0241 about lat. 65° S., this being the lowest specific gravity observed by the Challenger.

As regards the atmospheric pressure and the prevailing winds which necessarily result from the manner of its distribution, this ocean differs essentially from all other

oceans in presenting what is virtually an unbroken zone of water nearly as far south as the Antarctic Circle. Now from about lat. 30° S., where the highest atmospheric pressure of the southern hemisphere is massed, pressure falls from about 30·100 to 29·000 inches near lat. 63° S., from which it begins to rise as higher latitudes are reached, as shown by the prevailing winds. Over this vast region, more particularly from lat. 40° to 63° S., the prevailing winds all the year round are north-westerly and westerly. As the isobars are close to each other, these are high winds, and as they blow from lower to higher latitudes, in other words are constantly arriving into colder climates, they are accompanied with much rain, foul weather, and comparatively low surface specific gravities. The temperatures and specific gravities are further diminished by the melting of the ice, and of the icebergs so frequently met with in these seas.

The following table shows the mean specific gravities of the Pacific, Atlantic, and Indian Oceans from lat. 30° to 64° S. at depths of 100, 200, 300, 400, and 800 fathoms:—

	Pacific.		Atlantic.		Indian.	
	No. of Observations.	M. S. G.	No. of Observations.	M. S. G.	No. of Observations.	M. S. G.
100 fathoms . . .	14	1·0257	12	1·0261	5	1·0257
200 „ . . .	12	1·0255	11	1·0257	4	1·0256
300 „ . . .	12	1·0255	11	1·0256	3	1·0254
400 „ . . .	12	1·0255	12	1·0256	6	1·0255
800 „ . . .	10	1·0255	8	1·0257	...	...

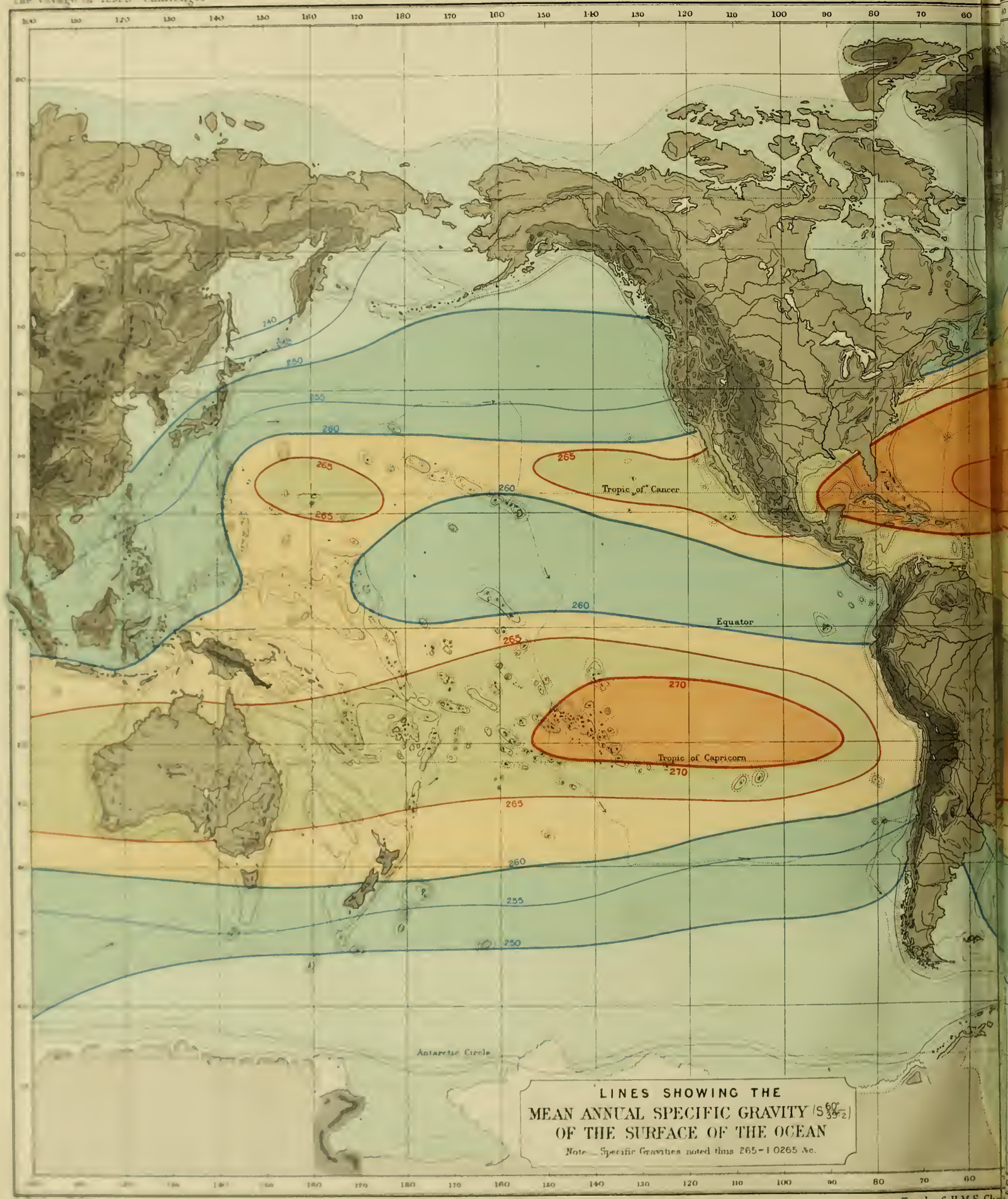
The mean latitude of the Pacific and Atlantic observations is lat. 36° S., but of the Indian Ocean lat. 55° S. The specific gravities of the three oceans from 100 to 800 fathoms closely agree with each other, those for the South Atlantic being slightly greater. Here, then, there appears to be a total absence of such low specific gravities as have been observed by Mohn between Spitzbergen and Greenland, and by Makaroff, though at less depths, near the Sea of Okhotsk. The relatively high specific gravities maintained in the Southern Ocean, notwithstanding the heavy rainfall and extensive ice-melting over the surface and upper layers of the sea, must be attributed to the broad and powerful surface currents from the north-west, bringing with them the high temperature and specific gravity of sub-tropical regions, as already described.

A map of the specific gravities at the bottom has been constructed (Map 16), a large number of such observations being available for the Report. The results for the three oceans south of lat. 30° S. are :—

	Number of Observations.	M. S. G.
Pacific, . . .	21	1·0258
Atlantic, . . .	20	1·0259
Indian Ocean, . .	13	1·0256

These, it will be seen, are all greater than the means of the five depths given above. The lower specific gravity of the Indian Ocean is due to the high latitudes in which they were observed by the Challenger. In the Atlantic, north of lat. 30° N., twenty-five observations give a mean of 1·0265. Hence even at the bottom of the ocean the North Atlantic continues to maintain a considerably higher specific gravity than any other ocean, and a higher temperature is carried down to the bottom. Similar results are shown by relatively high bottom specific gravities from Australia eastwards to long. 150° W. between Galapagos and Panama, and to the east of Brazil, which are immediately connected with the higher specific gravities and accompanying higher temperatures at different depths of these respective regions.

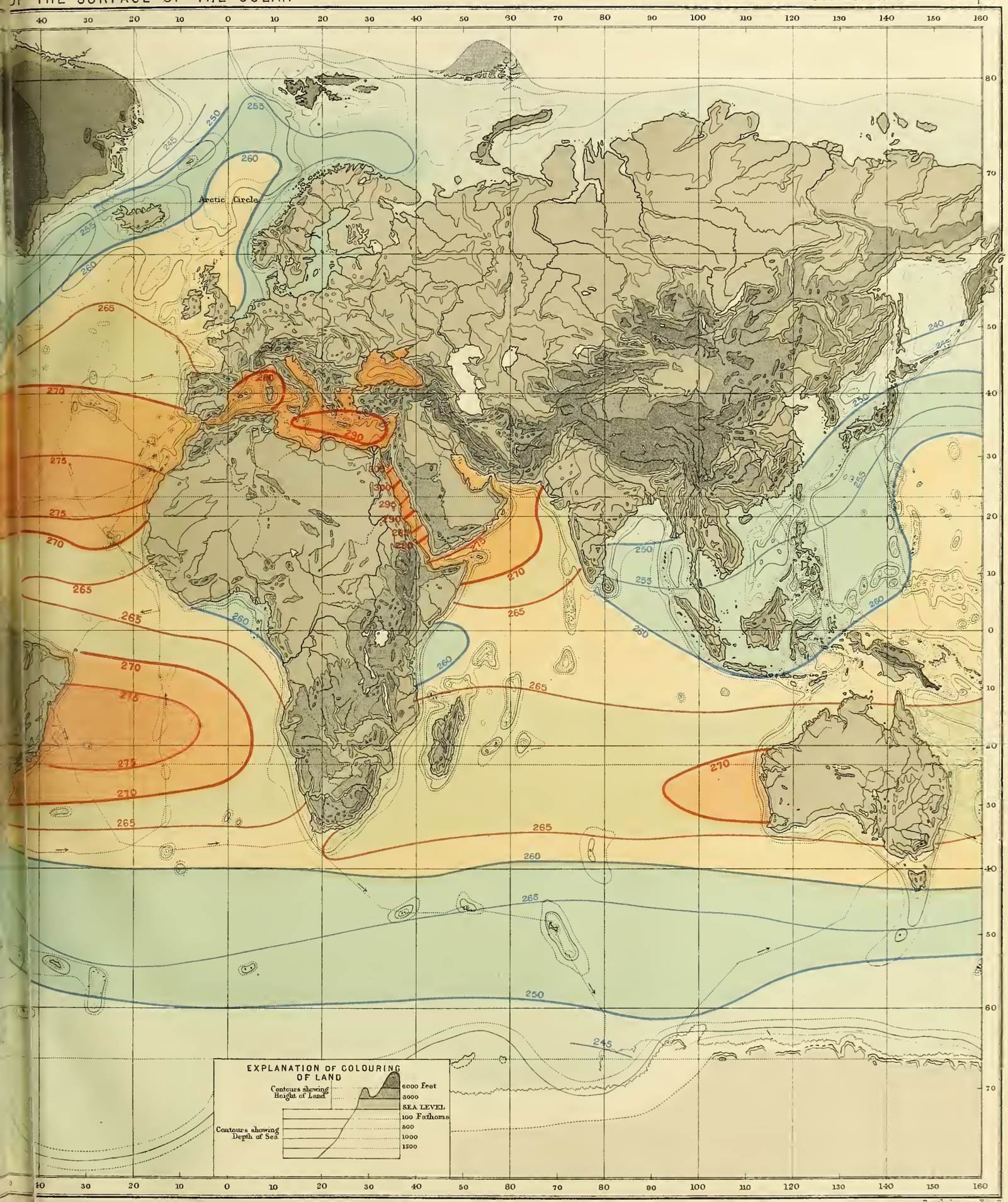
The close connection here indicated between the specific gravities and temperatures of the surface and the specific gravities and temperatures of the whole ocean down to the bottom, renders it difficult to overestimate the importance, in the further prosecution of this inquiry, of a correct knowledge of the mean annual specific gravity of the surface of the ocean, calculated from good monthly means which seldom appear in such publications. It is from such means, along with the corresponding means of the annual temperature of the surface, that the discussion must proceed.



LINES SHOWING THE
MEAN ANNUAL SPECIFIC GRAVITY (S 60 39-2)
OF THE SURFACE OF THE OCEAN

Note.—Specific Gravities noted thus 265=1·0265 &c.

Track of H.M.S. Ch


Arctic Circle
EXPLANATION OF COLOURING OF LAND
Contours showing Height of Land
6000 Feet
3000
SEA LEVEL
Contours showing Depth of Sea
100 Fathoms
500
1000
1500

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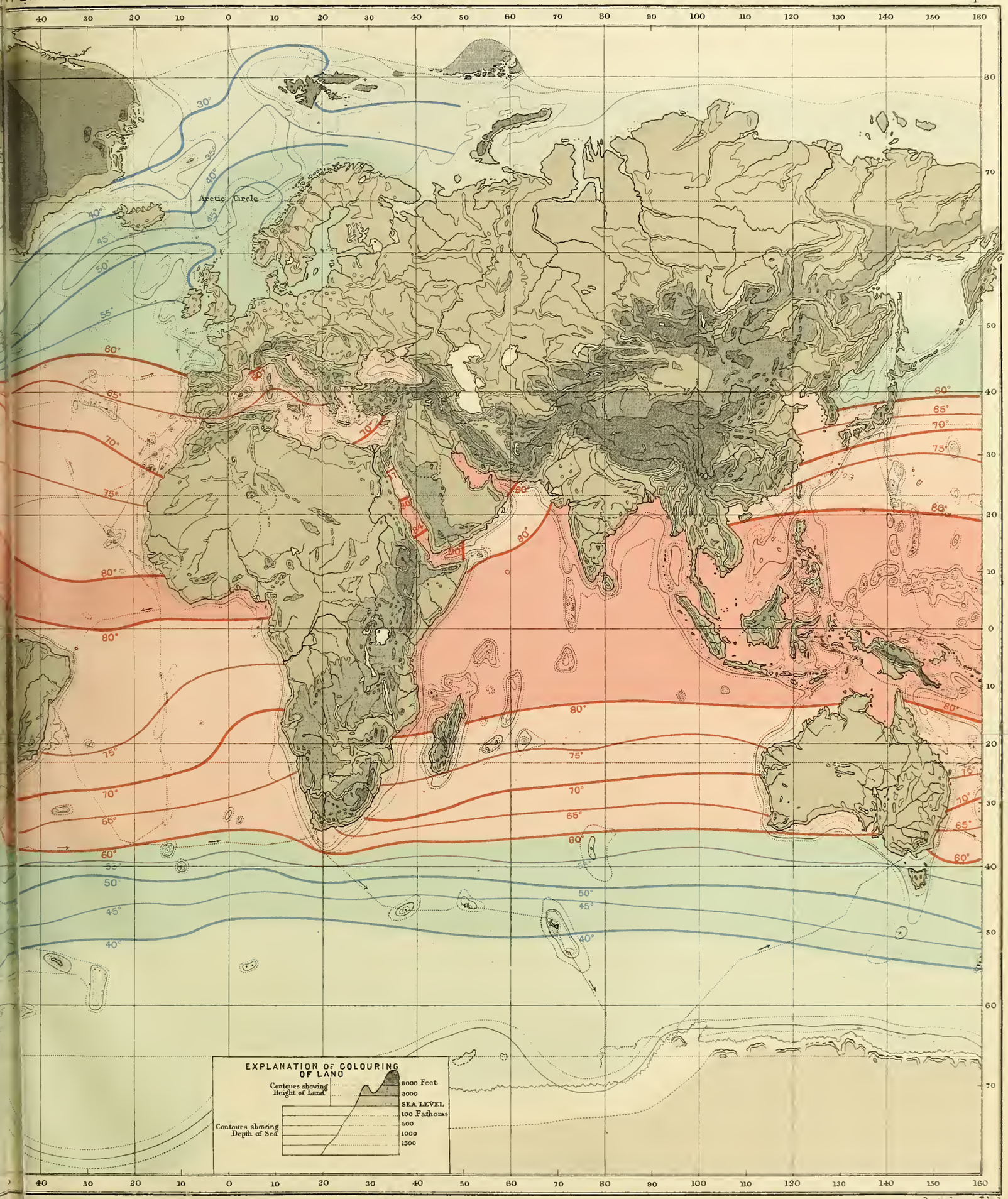
LINES SHOWING THE
MEAN ANNUAL SURFACE TEMPERATURE
OF THE OCEAN



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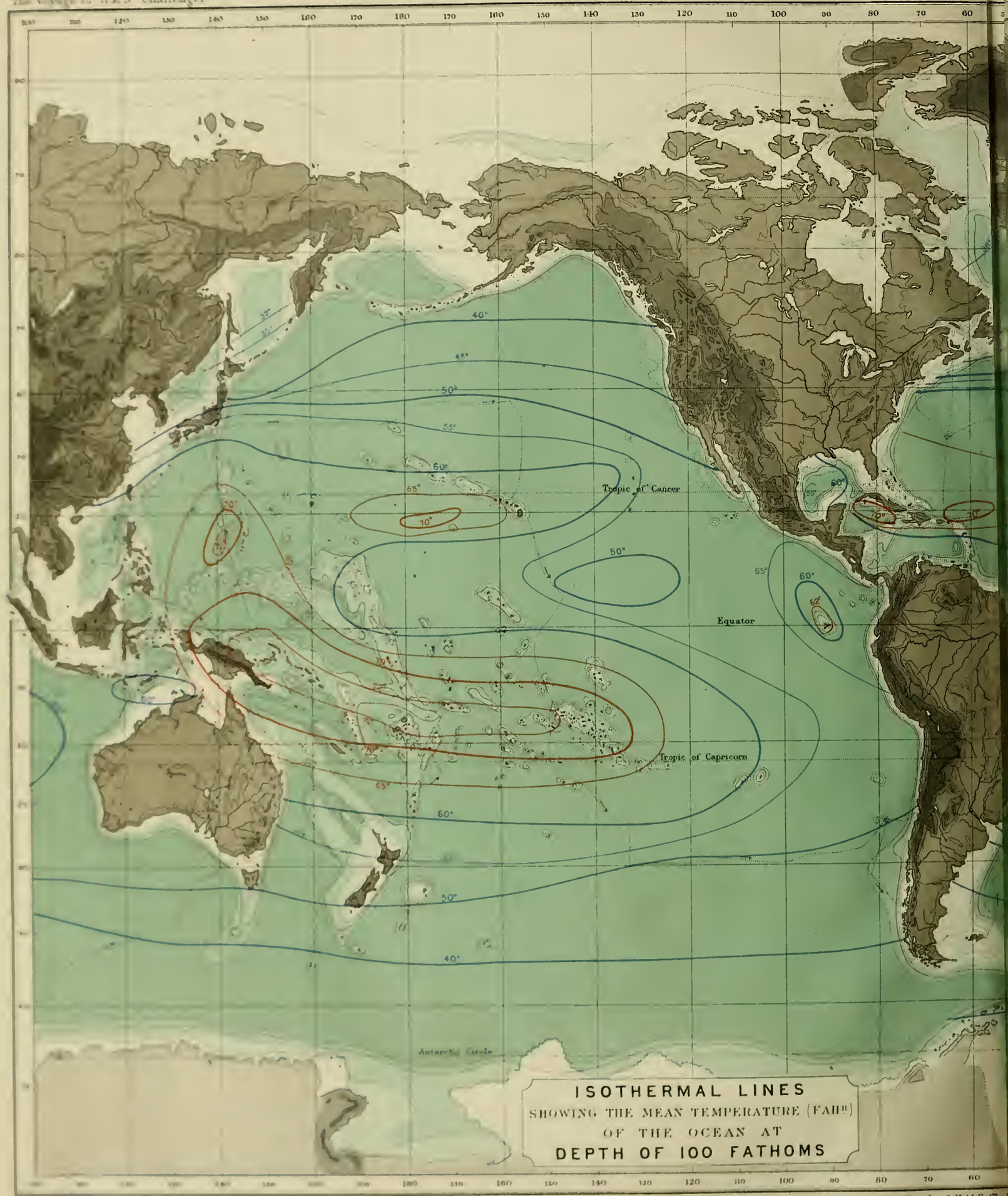

ISOTHERMAL LINES

SHOWING THE MEAN TEMPERATURE (FAHR.)

OF THE OCEAN AT

DEPTH OF 100 FATHOMS

Isothermals thus — Average shown in Red thus ——

Track of H.M.S. Challenger thus ——

own thus ...

Isothermals below Average shown in Blue thus ———

Bartholomew Edin.

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MEAN TEMPERATURE OF THE OCEANS AT

ISOTHERMAL LINES

SHOWING THE MEAN TEMPERATURE (FAHR.)

OF THE OCEAN AT

DEPTH OF 200 FATHOMS

Isothermals above Average shown in Red thus ——

Track of H.M.S. Chall

r shown thus ..... *Isothermals below Average shown in Blue thus* _____

Bartholomew, Edin.

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NATURAL HIST.

ISOTHERMAL LINES

SHOWING THE MEAN TEMPERATURE (FAHR.)

OF THE OCEAN AT

DEPTH OF 300 FATHOMS

Isothermals above Average shown in red thus ——

Track of H.M.S. Chal

shown thus

Isothermals below Average shown in Blue thus

Bartholomew Sculp.

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MEAN TEMPERATURE OF THE OCEANS AT

Track of H.M.S. Chall

shown thus

Isothermals below Average shown in Blue thus ———

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MEAN TEMPERATURE OF THE OCEANS

ISOTHERMAL LINES

SHOWING THE MEAN TEMPERATURE (FAHR.)
OF THE OCEAN AT
DEPTH OF 500 FATHOMS

Isothermals above Average shown in Red thus _____

Track of H.M.S. Chal

er shown thus .... *Isothermals below Average shown in Blue thus* ——

Bartholomew Edin.ʰ

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NATURAL HISTORY
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ISOTHERMAL LINES

SHOWING THE MEAN TEMPERATURE (FAHR.)

OF THE OCEAN AT

DEPTH OF 600 FATHOMS

Isothermals above Average shown in Red thus _____

Track of H.M.S. Chall

r shown thus

Isothermals below Average shown in Blue thus ———

Bartholomew Edin.

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NATURAL HISTORY
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SD

MEAN TEMPERATURE OF THE OCEANS AT

ISOTHERMAL LINES
SHOWING THE MEAN TEMPERATURE (FAHR.)
OF THE OCEAN AT
DEPTH OF 700 FATHOMS

Isothermals above Average shown in Red thus ——

Track of H.M.S. Chal

er shown thus

Isothermals below Average shown in Blue thus

Bartholomew Edin.

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NATURAL HISTORY

ISOTHERMAL LINES

SHOWING THE MEAN TEMPERATURE (FAHR.)
OF THE OCEAN AT
DEPTH OF 800 FATHOMS

Track of H.M.S. Challenger

Isothermals below Average shown in Blue thus ——

Bartholomew Edinr

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ISOTHERMAL LINES
SHOWING THE MEAN TEMPERATURE (FAHR.)
OF THE OCEAN AT
DEPTH OF 900 FATHOMS

Isothermals above Average shown in Red thus ——

Track of H.M.S Challenger

er shown thus ——— *Isothermals below Average shown in Blue thus* ———

Bartholomew, Edin.

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ZOOLOGY

ISOTHERMAL LINES
SHOWING THE MEAN TEMPERATURE (FAHR.)
OF THE OCEAN AT
DEPTH OF 1000 FATHOMS

Isothermals shown Average shown in Red thus ——

Track of H.M.S. Challenger

A. Petermann Delin.

er shown thus ... *Isothermals below Average shown in Blue thus* ——

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NATURAL HISTORY
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D

Isothermals above Average shown in Red thus ——— Track of H.M.S Challenger

Challenger shown thus ... .

Isothermals below Average shown in Blue thus——

Bartholomew Edin.

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FIGURES SHOWING THE
MEAN TEMPERATURE OF THE OCEAN
AT DEPTH OF 2200 FATHOMS

Note.—Red Figures show the Excess above 35°·2
Blue Figures show the Defect below 35°·2

Track of H.M.S. Challenger

Arctic Circle
EXPLANATION OF COLOURING
Contours showing Height of Land
6000 Feet
3000
SEA LEVEL
100 Fathoms
500
1000
1500
Contours showing Depth of Sea

r shown thus

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